Teacher's guide to
A new geography of Canada

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Contents

INTRODUCTION

A *New Geography of Canada* has been written and prepared for the beginning high school grades in Canada. The authors recognize that it will be used in the main by teachers who are not geography specialists and by many who have had little formal training in geography. It is also recognized that despite present trends towards more specialization at these grade levels, most teachers are still responsible for a considerable number and variety of subjects. In these circumstances, even the highly trained specialist welcomes assistance in the way of materials and ideas for lesson planning. The textbook itself supplies a wealth of materials. It cannot be too strongly emphasized that this is one of its primary functions. The enterprising teacher will soon realize that the best use of the book is as a source of materials around which particular lessons can be planned. *Before beginning the year's work and before making use of the Teacher's Guide, the preface to the book should be read carefully.*

This manual will be of assistance in lesson planning. Most of it comprises answers to questions raised in the context of the book and to those included in the more formal exercises. It should thus be of special value in developing the new approach to geography teaching embodied in the textbook. In some instances specific suggestions are made for supplementary work of various kinds. Where these involve map drawing or sketching from photographs, examples of such drawings and sketches have been included. The authors believe that this is one of the most valuable types of supplementary work.

A *New Geography of Canada* is based solidly on the inductive principle which recognizes that true learning involves what Bruner has called "the act of discovery."* In discovering geographical facts and principles, the pupil learns the structure and method of geography as a subject. In this sense, the present textbook emulates the principles that have recently had so much influence on science and mathematics teaching. In doing so, it provides materials and activities that lead the pupil to geographical understanding. Such understanding is best achieved, in the opinion of the authors, through the study of regions. A region is best studied by reference to samples and to particular places, these being depicted by means of photographs, large-scale maps, graphs, statistics, descriptive passages, and the like. It will be observed that this list follows a definite sequence from the material that most closely represents the real landscape (i.e. the photographs) to that which is the most symbolic and abstract (i.e., the written word). The skilful teacher utilizes all these materials, weaving them into a synthesis that leads pupils to an understanding of the "personality" of each region studied. The textbook serves to provide the generalizations and broad conclusions that are an essential outcome of the study of each region. Here too, however, summary exercises and other devices permit the pupils to draw their own conclusions as far as possible.

* See Jerome Bruner, *The Process of Education*, Harvard University Press, Cambridge, 1960. This is one of the most significant books on learning theory that has been published in many years.

Pages 26 to 49 in the textbook provide a good example of regional treatment in depth. It is suggested that these pages be read before the start of the year's work. Pages 5-9 in this manual provide extended comment on the treatment in question. However, it is assumed that each class will start the year with some study of the local community, branching out to a study of the home region and the home province. The authors are confident that for the majority of pupils who may use this book, there is included a study of each pupil's home region in sufficient depth to provide at least a good framework for more detailed investigation, utilizing local materials that may be available.

In general, the procedure followed in each chapter of the book may be summarized as follows:

1. A brief introduction refers to a general map, some recent statistics, or other data that serve to orient the pupils to the major region to be studied.
2. Several broad questions, arising out of the foregoing, are posed to serve as a focus for the study of the chapter.
3. The smaller regions that comprise the major Canadian region covered in the chapter are identified.
4. Each of these regions is presented in turn, following the general method already outlined.
5. The chapter concludes with a summary exercise that seeks to establish some broad conclusions and generalizations about the major region.

An examination of Chapter 7 (Saskatchewan) will indicate how the above structure has been developed.

Two final observations are in order concerning the use of the term "region" and the general form of the exercises.

Space does not permit any extended discussion of the nature of geography or of geographical regions.* Suffice it to say here that a region may be defined as any area of the earth's surface, large or small, throughout which any given element, or elements, is uniform. British Columbia is a major region in which unified political control is maintained (by a provincial government) and in which a common physical feature (mountainous topography) is almost everywhere present. These are two of the elements, among many, that contribute to regional distinctiveness. Within the major region called British Columbia, many smaller regions can be identified, using other criteria. The Okanagan Valley, for example, is characterized as a semi-arid, well-populated region of the interior plateau of British Columbia, where fruit-growing is the most obvious form of land use, with ranching, logging, and tourism as other significant forms of economic activity.

These examples will indicate that there are many kinds and sizes of geographical regions. Pupils should be led to realize that a region is essentially a useful device for studying a large area and is a convenient way of breaking down large units of the

* Teachers will find a useful discussion of these topics in Chapter 1 of Tomkins and Hills, *A Regional Geography of North America* (also available in *Canada: A Regional Geography* by the same authors), published by W. J. Gage Ltd. (1961). At a more advanced level, Murphey's *Introduction to Geography* (Rand McNally, 1960, available in Canada from W. J. Gage Ltd.) includes a fine discussion of regional theory as well as many superb examples of regional synthesis.

earth's surface into smaller, more manageable units for purposes of geographical investigation. Regional "personality" refers to the essential character of a particular region. The understanding of such character is one of the most desirable outcomes of good geography teaching. The summary exercises in the textbook, at the conclusions of sections and chapters, provide many opportunities for the pupil to "regionalize." Class discussions should provide further opportunities.

Most of the exercises are organized under main headings which are stated in the form of questions, or as problems, or in topical form. In each case, the theme suggested by the heading is developed by means of questions based on the various materials provided. A good example of this approach is given on pages 247-250. These pages include an exercise and materials designed to elicit some understanding of the "personality" of the Upper St. John Valley of New Brunswick. The best approach to the use of the exercises is suggested by item 4 of the preface to the book.

In conclusion, it is recommended that the *Atlas of Canada* be used to supplement this book. It is available in most public libraries and should be in every school library. Individual sheets can be purchased from the Geographical Branch, Department of Mines and Technical Surveys, Ottawa. Information about other sources and references will be found at the ends of the chapters of *A Regional Geography of North America* or in *Canada: A Regional Geography* by Tomkins and Hills (W. J. Gage Limited, 1961) and in Appendix 2 of the same book.

CHAPTER 1 INTRODUCING CANADA

Note: Throughout the manual, page references are to places in the textbook where the questions are to be found that are answered here. In cases where answers to an exercise are provided, the heading or title of this exercise is given in the manual.

P. 2 The Rogers Pass section was the most difficult and costly to build because of the rugged mountains of this area.

P. 3 Canada is a very large country.
The U.S.S.R. is the largest country in the world.
Canada is almost half as big as the U.S.S.R.

P. 4 Japan is about 125 times more crowded than Canada; England 163 times; United States 12 times.

P. 5 Dense forest, high mountains, muskeg, and ice sheets are not suitable for cultivation.

P. 6 Figure 1-7 is level farmland; 1-8 rugged mountains; 1-9 is a lumbering scene; 1-10 is ranching in a treeless area. Figs. 1-11 and 1-12 show miners and fishermen.
Toronto is a large modern city; Pond Inlet is a tiny northern settlement. Contrast relief, climate, housing, occupations, school, and social life, etc.
Winnipeg is much colder in winter than Victoria.
In July in Winnipeg people try to escape from the hot weather, in winter from the intense cold.

P. 8 Imported foods include tea, coffee, cocoa, pineapple, rice, and oranges. Most vegetables and fruits must be imported in winter.
Expenses of winter living in Montreal include central heating, heavy clothing, winterizing of cars, and snow removal.
Canada extends as far north as 83°N.

P. 9 The large dots and circles represent towns and cities. Note that some large centres (e.g. Saskatoon) are represented by clusters of dots. There are two sizes of dot: the smaller one in more heavily populated areas represents 1000 persons; the larger one in very sparsely populated areas (e.g. the Northwest Territories and the Yukon) represents 100 persons. Teachers should enquire of the Dominion Bureau of Statistics, Ottawa, regarding a more up-to-date population map of Canada based on the 1961 census. This was not yet available early in 1963, but should be in the near future.

P. 9 How is Canada's population distributed?
1. Most of Canada is very sparsely populated.
2. (a) Northern Canada has very few settlements. Southern Canada has many large cities and many other smaller centres of population.
(b) Most Canadians live within 200 miles of the United States border.
(c) Most Canadians live in Southern Ontario and Southern Quebec. Southwestern British Columbia, the Southern Prairies, and the Atlantic Provinces also contain large numbers of people.
3. (a) Atlantic Provinces – population concentrated along coasts, except for the quite uniform distribution in Prince Edward Island.
(b) S. Quebec and S. Ontario – population greatest in Great Lakes-St. Lawrence Lowlands. Most people live within 50 miles of the St. Lawrence River and the lower Great Lakes.
(c) Prairie Provinces – populated region greater in extent but less densely populated than other regions. No other large region has such a uniform population distribution.
(d) British Columbia – great concentration in southwest corner, strung out along the valleys of the interior.
Note: At this stage no detailed explanations of the features of the population distribution should be attempted. However, pupils may be encouraged to speculate about reasons for the distribution and to provide tentative explanations. Reference to a relief map will suggest, for example, that the population of the prairies extends over a huge area and is quite uniformly distributed as a result, in part, of level terrain. Such ideas must be handled carefully, for it is important to avoid implanting the old ideas of geographic determinism, i.e. the notion that the physical environment absolutely determines where and how people live.

P. 13 Material on pages 13-17 should be considered very carefully. At least some of the local study activities suggested can be carried out in any school and make an excellent introduction to the year's work. The local town planning department or school board officers may have very large-scale maps (500 feet to the inch or larger) available. From such, a map of the school neighborhood can be drawn on a stencil or spirit duplicator master and given to each pupil.

P. 14 Prominent features in both the map and photograph include Hamilton Beach, Burlington Canal, Hamilton Harbor, industrial properties along waterfront.

P. 16 Six days had winds from the west or southwest. Six days had rain. Two days had strong winds.

P. 19 What is the location and position of Southern Ontario?

1. (a) Lakes Huron, Erie, and Ontario bound the Lake Peninsula on three sides.
(b) Owen Sound, Goderich, Sarnia, Windsor, London, Brantford, Kitchener, St. Catharines, Hamilton, Oakville, Toronto, Oshawa, Belleville, Kingston, Cornwall, and Ottawa are located on the lakes and rivers.
(c) Kingston, Cornwall, and Ottawa are located on the St. Lawrence and Ottawa rivers.
2. (a) The approximate latitudes are Toronto 44°N., Hamilton 43°N., London 43°N., Windsor 42°N., compared with Montreal 46°N., Winnipeg 50°N., Edmonton 54°N., Vancouver 49°N.
(b) Toronto is 375 miles further from the North Pole than Vancouver, Hamilton 450 miles further than Winnipeg, Windsor 825 miles further than Edmonton.
(c) The latitude of Point Pelee is 42°N. It is closer to the Equator than to the North Pole.
(d) Minneapolis, Portland, Oregon, and Seattle are located north of Windsor.

P. 22 How does the Great Lakes-St. Lawrence Waterway unify Southern Ontario?

1. (a) At Montreal Harbor the "laker" is 21 feet above sea level.
(b) Vessels take two steps between Montreal and Lake St. Louis.
2. (a) At Snell Lock the vessel has been raised 131 feet above Montreal Harbor.
(b) Between Snell Lock and Lake Ontario the ship must pass through two more locks.
3. (d) The navigation channel is located on the U.S. side of the boundary.
4. The photographer was standing in New York State. The Thousand Islands are a great tourist attraction and recreation area for Ontario.
5. (a) Kingston is located where the St. Lawrence River flows out of Lake Ontario. Toronto and Hamilton are the largest ports.
(b) The total rise in elevation from Lake Ontario to Lake Erie is 326 feet.
The Welland Canal has been built around the falls. It has 8 locks.
(c) Niagara Falls is a source of wealth both as a tourist attraction and a power site.
6. Lack of harbors accounts for the lack of large cities on the north shore of Lake Erie.
7. (a) The difference in elevation between Lake Erie and Lake Huron is 8 feet.
(b) A "laker" must pass through the Detroit River, Lake St. Clair, and the St. Clair River on a westbound trip, and pass Windsor and Sarnia.
8. (a) At Sault Ste. Marie vessels pass from Lake Huron to Lake Superior via the St. Mary's River.
(b) Two canals exist on the United States side of the river.
(c) The rise in elevation between Lake Huron and Lake Superior is 22 feet.
(d) Fort William and Port Arthur serve as ports at the western end of Lake Superior. Grain reaches these ports by rail.
(e) Between Montreal Harbor and Lake Superior a vessel rises 581 feet.
The inland waterway provides a cheap means of moving goods. Vast quantities of power are supplied at Beauharnois, the International Rapids, and Niagara.

Note: Valuable information on the St. Lawrence Seaway and its operations can be obtained from the St. Lawrence Seaway Authority, Cornwall, Ontario.

The Niagara Region pp. 26-49

Note to teacher: It will be observed that the Niagara Region has been presented in considerable detail. It is intended to illustrate how a regional analysis may be made, in depth, of any region, using the full range of materials advocated in this text. In this sense, it introduces pupils to the tools of the geographer and for schools in Ontario especially may serve as a prototype for all regional studies. However, for schools in other provinces where the year's work may (as it should) begin with the home province, it will be found that any chapter provides a reasonable introduction to the use of geographic materials and tools. However, the teacher in Alberta, for example, may find it useful to refer to Chapter 2, and especially to this discussion of the Niagara Region, if she feels the need for guidance in introducing some of the materials.

The general pattern of the regional discussion on pages 26-49 is as follows:
1. Figure 2-10 provides a general map of the region and serves to orient the pupils briefly prior to the detailed study. It may be useful to refer back to Figure 2-2 so that pupils may see where the Niagara Region is located in relation to Southern Ontario as a whole. It is also a good idea in introducing a region to locate it in relation to the home region. Using an atlas or wall map of Canada, the teacher in Halifax, for example, might ask: Where is Hamilton in relation to us? What is its latitude and longitude? Is it north or south of Halifax? How far away is it? How long would it take us to drive there? What route would we follow? (Note the

value of road maps in answering many of these questions. Pupils should be encouraged to make their own collections of road maps as the study of Canada proceeds.)

2. Three of the basic materials of the first sample study are mentioned on page 26: the picture of the farm (Figure 2-11), the map of the farm (Figure 2-12), and the topographic map (Figure 2-13). Lincoln County should be located in Figure 2-3. The explanation of the topographic map scale at the bottom of the page can be taken up later when the map is studied in detail on pages 36-38.

3. The study of the White farm is the first *sample study* in the book. A sample study has been defined as the study of a particular unit (e.g. a farm, a factory, a village, etc.) that has been chosen to typify general conditions relating to a topic or area. In this case, Mr. White's farm illustrates the basic factors involved in growing fruit in the Niagara Region and typifies various geographical features of the region. From this detailed study of an actual and representative farm, pupils can understand the broad generalizations about terrain, climate, marketing problems, etc. that are essential to a comprehension of conditions in the Fruit Belt. It is important for the teacher to realize that these conditions can be meaningful only in a context that begins with detailed, realistic samples such as this. The essential steps in the study are as follows:

(a) picture study (Figure 2-11) — as the closest representation of the actual landscape.

(b) large-scale map study (Figure 2-12) correlated with picture study.

(c) brief history of the farm, discussion of land use, soils, climatic conditions, etc. (pages 30-31). Note the reference at this stage to the generalized map in Figure 2-15.

(d) further climatic studies by reference to Figure 2-16. This is the first climatic graph used in the book and should be analyzed very carefully by means of the exercise and other material on page 32. Note the emphasis on comparison with the pupil's home region. The statistics of the home region are available from the nearest weather office. Pupils should be shown how the graph of St. Catharines was constructed and should draw a graph of their own locality. The emphasis in the study of these graphs should be on the broad characteristics of the climate that they represent.

(e) firsthand descriptions (in this case from newspaper accounts) of climatic conditions with discussion of their possible effects on farming. The answers to the three questions on page 34 comprise a summary of the main climatic factors affecting fruit growing.

(f) an account of seasonal operations on Mr. White's farm, with exercise based on the material (pages 34-35).

(g) an account of marketing procedures and problems with statement of Mr. White's main expenses and chief sources of income.

(h) summary discussion of the importance of the Niagara Fruit Belt production in relation to fruit growing in Ontario and in Canada as a whole (page 36).

4. A detailed study of the topographic map (Figure 2-13) is made on pages 36-39. The material on pages 36-37 should assist pupils in learning to read contours and other map data. This should be taught carefully and systematically as a basis for the study of the remaining large-scale maps in the book. The exercise on pages 37-38 should be taken up very systematically. The map legend that comprises the front endpaper of the book should be referred to here. As it was not possible to place Figure 2-13 adjacent to the exercise and discussion on pages 36-38, teachers may find it convenient to put the questions on the blackboard or to mimeograph individual copies for pupils to use with the map on page 29 directly beside them as they study it. Pupils will be interested to look at the complete sheet (30 M/3 West Half in the National Topographic Series) from which this black and white extract was taken. Single copies of the full sheets from which all the extracts in this book are taken will provide an effective and continuing bulletin board display in the classroom throughout the year. Single copies of sheets cost 30 cents each (50 cents less 40% discount to schools) and may be ordered directly from the Map Distribution Office, Department of Mines and Technical Surveys, 601 Booth St., Ottawa, Ontario, using the code numbers given in the text. Large-scale maps serve the same purpose as pictures and other materials used, i.e. they permit valid generalizations to be made about a large region from a study on a scale that permits the pupil to imagine accurately the living landscape. By locating individual farm buildings, villages, orchards, roads, and other buildings the pupil acquires a further realistic insight into the "personality" of the region.

5. A general summary discussion of problems in the Fruit Belt, especially of those relating to urban-industrial encroachment on farmland, is given on pages 39-40.

6. A study of Hamilton on pages 40-47 provides an industrial contrast to the essentially agricultural emphasis of the regional study thus far. Geography texts tend to over-emphasize rural areas, overlooking the fact that industrial and urban areas are nowadays usually more significant. The Niagara Region provides an excellent example of a region containing highly developed rural, urban, and industrial landscapes. The study of Hamilton utilizes various materials: written text, a geological map (Figure 2-22), another extract from a

topographic map (Figure 2-23), and two photographs (Figures 2-24 and 2-25). In each case, the written text and the exercises should lead pupils to some understanding of the "personality" of Hamilton as an urban centre of major significance. The method and the materials of the study are intended to suggest how all urban areas are to be treated. The seven discussion questions on page 47 should assist pupils to draw together the generalizations that emerge from the study. The suggested answers to the seven questions are given on pages 8 and 9 of this manual.

7. Following the study of Hamilton, some attention is given to the eastern end of the Niagara Region, especially to the importance of the Welland Canal as one of Canada's major inland water routes, to Niagara Falls as a great world producer of hydro-electricity and as a tourist attraction, and to St. Catharines and surrounding towns as a major industrial complex of Southern Ontario. Note the brief description of the Niagara Region given in the third paragraph of page 49. Some discussion of the two questions posed here will be very useful.

P. 26 The limits of the Niagara Region are Lake Ontario, the Niagara River and Lake Erie.

P. 27 A visit to Mr. White's farm

1. The land is flat. Most of the trees are planted in regular rows and plots unlike natural woodland.
2. (a) Vineland is about 1¾ miles south of the farm.
(b) The Provincial Experimental Farm and Lake Ontario are north of Mr. White's farm. His farm is about 1¼ miles from the lake.
3. Vineland is about 20 miles east of Hamilton, 6 miles west of St. Catharines.
4. Peaches take up most of the land.
Strawberries, sour cherries, pears, prunes, and apples are also grown.
5. (a) A lane leads to the back of the farm.
(b) The tall trees are bushland. This area is east of the house.
6. (b) Old barns suggest that livestock was formerly kept. The large building opposite the house is used for packing.
(c) A power line supported by poles is visible in the foreground of the photograph.

P. 30 The shoreline of Lake Iroquois was about two miles south of Lake Ontario.
Mr. White spends an average of about $40 per acre on fertilizer. On the bench land, less than 30% of the land is devoted to fruit.

P. 32 The climate of the Fruit Belt

1. July and August have average temperatures above 70°F.
2. 3 months have average temperatures below freezing.
4. (a) Total annual precipitation is 27.4 inches.
(b) It is evenly distributed throughout the year.
5. This equals 3.8 inches of rainfall.

P. 33 The average April rainfall at St. Catharines is almost 3 inches. This is not an unusually wet month.

P. 34 How does the climate affect Mr. White's work?

1. Climatic hazards include severe thunderstorms and winter ice storms.
2. (a) Factors favoring fruit growing are a fairly long growing season, warm summers, adequate precipitation at all seasons.
(b) Lake Ontario helps delay both spring warmth and fall frost. This delays blossoming until after the last frost and lessens the danger of frost damage to fruit in the fall.
3. Figures such as those in 2-16 must be treated carefully because they are averages and do not indicate actual conditions at a given time or during a given year.

P. 35 Around the year on Mr. White's farm

1. Pruning is done in mid-winter.
2. Cultivation means keeping soil loose and free of weeds. It helps destroy fungus diseases.
3. Mr. White tries to maintain the fertility of the soil by applying artificial fertilizers and by letting surplus peaches rot on the ground. He combats diseases by cultivating the soil and by spraying.
4. 2-4 acres of strawberries are the first crop harvested.
5. After harvesting, in July, patches are clipped, fertilized, and re-planted.
6. 3-4 acres of sweet and sour cherries are grown. They are harvested in early July.
7. Peaches are thinned in July by beating with a rubber hose. Surplus peaches fertilize ground. Total acreage of peaches is about 30 acres.
8. The peach season lasts from late July until early September. Pickers are not paid on a piece-work basis because great care is needed in selecting ripe peaches.
9. The "cooler" can be used to help regulate the production of peaches at the peak of the season. Plums, prune plums, and pears are also harvested in September.
10. Apples are harvested from October to December.
11. Mr. White takes his vacation late in October because, after harvesting, this is the least busy season.
12. In November orchards are cleaned up, old trees removed, etc.

Suggested pupil exercise: make a circular diagram to show the year's work on Mr. White's farm. Figure 6-1 on page 256 will provide some idea about how this can be done.

P. 36 56% of Mr. White's income is accounted for by peaches. Peaches and strawberries together account for 81%.

The Escarpment is about 4-5 miles south of Lake Ontario.
P. 36 Vineland is about 154 feet above the lake.
P. 37 Vineland is about 1¼ miles from Vineland Station and the drop in elevation is 100 feet.
Above the Escarpment the contour lines are widely spaced indicating fairly level land.
The spot elevation south of Beamsville is 680 feet.

The topographic map of the Niagara Fruit Belt
1. The Queen Elizabeth Way, Highway 8, and the C.N.R. cross this region.
(a) They run from east to west and are located below the Escarpment.
(b) The Queen Elizabeth Way can follow such a straight route because the land is so flat.
2. (a) Dense rural settlement and intensive cultivation requires many roads.
(b) Many roads terminate at the foot of the Escarpment.
(c) Roads cross the Escarpment where it is most gently sloping. They pass through Beamsville and Jordan.
4. Villages shown include Beamsville Station, Vineland Station, and Jordan Station, Beamsville, Vineland, Jordan, and Campden.
(a) All except Campden are below the Escarpment.
(b) Beamsville is the largest settlement. Beamsville, Vineland, and Jordan are located on the east-west route following the foot of the Escarpment. These are favorable locations for water supply and in early times provided good access to the different types of land above and below the Escarpment. This is less important today. After the railway was built further north, a smaller settlement grew up on the railway at the closest point to each of these villages. Campden is a farming settlement on the till plain above the Escarpment.
(d) Children living near Beamsville Station must attend school in Beamsville.
(e) The larger villages were established before the railway. See (b) above.
5. (a) Nearly all houses and farms are near the roads.
(b) Settlement is more dense below the Escarpment.
(c) "Vineland" suggests that it is located in a fruit-growing area.
P. 39 Mr. White pays $1000 in taxes.

P. 40 Farmland in the Niagara Fruit Belt
1. Louth, Grantham, and Niagara townships have the highest percentage of farmland devoted to fruit and vegetables. All the townships with no land devoted to fruit and vegetables are above the Escarpment.
2. Mr. White's farm is typical in that it is devoted exclusively to fruit, but it is larger than most farms of the Niagara Fruit Belt.

P. 40 Hamilton: Industrial Capital of the Niagara Region
Limestone and shale are found in the city.
P. 43 Land on the north side is marshy and unsuitable for construction of houses and factories.
P. 43 The site and functions of Hamilton
1. (a) The bar is about four miles long.
(b) Beaches and a park indicate recreational uses.
(c) The bar carries the main road (the Queen Elizabeth Way) thus by-passing the city of Hamilton. The harbor entrance is called the Burlington Canal. The span is high in order to allow ships to pass beneath, on their way to the Hamilton industrial areas.
(d) Beaches, railway tracks, transmission lines, and trees are also visible. The steel works are visible on the far side of the harbor. The camera was pointing southwest.
2. (a) The distance is about four miles.
(b) The 250-foot contour extends along the waterfront.
(c) Rectangular, very regular shorelines suggest that much of the land is reclaimed.
3. (b) Hamilton Beach and Burlington Canal can be identified in the distance.
(c) Roads, railways, and boats are visible.
(d) Limestone brought by road or rail from the Niagara Escarpment and coke brought by boat from Pennsylvania are piled there.
4. Land along the north shore is used for farmland, horticultural gardens, parkland, golf course, woodland, and suburban housing.
5. Northwest of the harbor, the land is very hilly and is drained by many small creeks, which make the land surface very broken.
6. McMaster University is indicated on the map.

P. 47 Discussion of Hamilton
1. Hamilton is located on the extreme southwestern shore of Lake Ontario on land made up of glacial deposits (morainic materials), lacustrine deposits (sands and gravels of old Lake Iroquois), and underlying rock formations made up mainly of limestone and shale. The main part of the site is located between the Niagara Escarpment and Lake Ontario, on quite level land. The original shoreline consisted of marshy land which when drained and filled in formed excellent industrial land and provided good port facilities. Hamilton Harbor comprises about ten square miles of water surface at the extreme western end of Lake Ontario from which it is separated by the bar known as Hamilton Beach. The Escarpment to the south and west of Hamilton is called "The Mountain" and provides good recreational land. Hamilton is a long, narrow city that is expanding eastward mainly because "The Mountain" prevents southward expansion.
2. Hamilton was located on the south shore of Lake Ontario. The land here was more level than that

on the north shore but is away from the main transportation routes that cross this part of Southern Ontario. The marshy shoreline of the chosen site was avoided by the early settlers but now provides excellent sites for industrial and transportation facilities.

3. Important forms of land use (most of them visible on the topographic map in Figure 2-23) include the following: residential land (e.g. Westdale and the main part of the city east of that area); recreational land (the escarpment or "mountain," public gardens, Hamilton Beach, small parks, racetracks, etc.); industrial land (mainly along the waterfront, including also extensive areas devoted to transportation, most notably railways); commercial land (shopping centres, business premises, etc.); institutional buildings (hospitals, schools, etc.); cemeteries.

Note: See Figure 8-29, page 359, for a good method of classifying land and land use in urban areas.

4. The excellent harbor, consisting of an enclosed water surface, is the largest on the Canadian Great Lakes. It has played a vital role in the development of industry, especially of the iron and steel industry which relies almost entirely on imported iron ore and coal (see Figure 2-38, page 61).

5. Local sources of food include fruit and vegetables from nearby market gardens, fruit from adjacent orchard areas, dairy products from many adjacent areas of Southern Ontario, and a wide variety of foodstuffs easily imported from the United States and overseas. Raw materials, apart from those used in food-processing industries, include chiefly iron ore (from Labrador and various centres in Ontario), coal (from the United States), oil and natural gas (from Western Canada), tobacco (from the nearby "tobacco counties" discussed on pages 73 to 76), rubber (natural rubber from overseas, synthetic rubber from Sarnia), and many others. Hydro-electricity is a source of power available from nearby Niagara Falls. Thermal electricity is produced from steam plants burning imported coal. Oil and natural gas are other important sources of power. (Note that coal, oil, and natural gas are not only sources of energy and power but supply mainly chemicals and other raw materials used in modern industry. See pages 351 and 352 for information about products obtainable from oil and natural gas.)

6. Hamilton functions as (a) the main urban centre of the Niagara Region; (b) a major Canadian port — the largest on the Great Lakes next to Toronto; (c) one of Canada's three great manufacturing cities and the nation's chief iron and steel making centre; (d) a centre of business, finance, and education (McMaster University is one of the leading centres of higher learning in Ontario). Few Canadian cities are better located in relation to markets, since the majority of Canada's population lives within 500 miles of Hamilton. Excellent water, rail, road, and air routes connect the city with its markets.

7. Hamilton is a good illustration of the advantages that have made Southern Ontario the home of more Canadians than any other region. It also illustrates why the region is pre-eminent in manufacturing. Transportation facilities via the Great Lakes and convenient lowland "corridors" permit the easy import of raw materials and the export of finished goods. Water-power resources are available nearby. An immense market comprising more than half the population of Canada is available in Southern Quebec and Ontario. This population is well educated and highly skilled, and industrial centres such as Hamilton draw their manpower from it. The proximity of the greatest centres of American population and industry is also a major factor. These centres supply markets for many of Ontario's goods. They also contain the headquarters of many Canadian industries and supply managerial, research, and technical skills to their branch factories, as well as raw materials, parts, etc. In a geographical sense, Southern Ontario is an extension of the American Manufacturing Belt.

P. 47 The Welland Canal is about 25 miles long.

P. 48 Industries of St. Catharines include canning and freezing of vegetables and fruits, jam making. St. Catharines is on the Welland Canal and on the east-west routes through the Niagara corridor to the United States — a good location for receiving raw materials and shipping out manufactured products.

South-Central Ontario

P. 49 Five other large cities in South-Central Ontario include Oakville, Oshawa, Belleville, Peterborough, and Barrie.

P. 51 The early landscape and agriculture of Southern Ontario

Note: Pages 49-52 provide historical background essential to an understanding of Southern Ontario. The account of pioneer life and prints of pioneer farming use the approach of *historical geography*. This may be defined as the geography of the past. Pupils should be led to understand what Southern Ontario looked like 125 years ago. This involves some understanding of what the geography of the province was at that time. It also involves some understanding of the idea that the landscape is constantly undergoing change. How has the appearance of *our* neighborhood changed since 1950? What changes are taking place in it now? These are interesting and relevant questions for the pupils to discuss if time permits. Chapter 5 of *A Regional Geography of North America* by Tomkins and Hills provides further material on the evolution of the Ontario landscape.

1. Radcliff used logs and limestone for building his cabin.
2. (a) Wood was used for construction and fuel.
(b) Forest was a problem because it had to be cleared before food crops could be grown.
3. Nine varieties of deciduous trees are mentioned.
4. Early source of income was ashes but Radcliff expected wheat would make him prosperous.
5. Figure 2-27 shows a thick cover of mixed forest, removal of which, especially the stumps, created a problem. The log cabin is prominent, also some livestock. The men are using oxen.
6. (a) Most of the trees have been removed.
(b) More buildings have been added and they are more elaborate. Fields are fenced and under cultivation. There is a large barn suggesting that livestock are important. Roads have been built and the river bridged.
(c) Many elaborate buildings and the neat appearance of the land and buildings testify that the farmer has prospered.
7. (a) The land is flat.
(b) Intensive cultivation suggests rich soil.
(c) This land is devoted to intensive cultivation of specialized crops. The farmer must sell his produce elsewhere in order to provide his own food. Most of the tree cover has been removed. There are more houses and buildings than in Radcliff's time.

P. 53 Soil erosion, lack of regulation of water, depletion of fish and game reserves often result from the removal of the forest cover.

P. 53 The fruit and vegetable belt is located along the north shore of Lake Ontario.
Diversified livestock production includes cream, beef, hogs, and poultry.

P. 54 Holland Marsh: an important agricultural district of Southern Ontario

1. (a) The Holland and Schomberg rivers drain Holland Marsh and flow into Lake Simcoe.
(b) Ditches have been used to drain the marsh.
(c) Bradford, Holland Landing, and Newmarket are the main towns. Bradford is about 35 miles from Toronto. There are many roads and a railway to transport produce to market. People at Bradford probably pack and process vegetables, maintain drainage systems, and work in service industries.
(d) Future farmlands are located immediately south of Lake Simcoe.
2. Flat land is a prominent feature in Figure 2-29. The crop is celery. People are harvesting it and packing it in boxes.

P. 55 The land in Figure 2-32 is being used for pasturing cattle. In Fig. 2-33 several large and well kept buildings suggest a prosperous farm. The barn and silo are used for winter housing for animals and production of winter feed.

P. 56 Most of Southern Ontario consists of land of low relief with local variations in climate. The best soils are used for cultivation and the availability of large local markets has stimulated the growth of specialist production. Dairying is very widespread.

P. 56 Toronto has grown from a tiny lakefront settlement in 1793 to cover an area of more than 30 square miles today. Most of this growth has taken place since 1834. Metropolitan Toronto covers about 150 square miles. Twelve townships are included in Metropolitan Toronto.

P. 58 The Port of Toronto today

Note: Good material and information is available from the Toronto Harbor Commission, 60 Harbor St., Toronto 1, Ont.

1. (a) The vessels bear the signs "French Line" and "Manchester Liners," suggesting that they originate overseas.
(b) Tracks with long lines of freight cars are visible on the waterfront.
(c) The tall buildings are suitable for offices, and as administrative and commercial properties.
The land is flat.
2. (a) The distance is about five miles.
(b) Toronto Harbor covers about six square miles. Like Hamilton Harbor it is almost completely enclosed.
(c) Sheltered anchorage makes this a good site for a port.
(d) A ship from Montreal would approach Toronto by the Eastern Channel, one from Hamilton by the Western Channel.
(e) The deepest channel is 27 feet. The straight, narrow channel with entrances carefully marked by lights and buoys suggests that it has been improved.
(f) The regular, rectangular indentations of the shoreline suggest that it has been reclaimed by "fill."
(g) Goods handled include grain, rubber, sugar, coal, oil, and various raw materials for industry. Scrap may be obtained from dismantled buildings, used cars; it is being loaded by cranes.
(h) Industries include flour milling, sugar refining, oil refining, brewing, manufacturing electrical and rubber goods, and the production of electricity from coal. Imported raw materials used include grain (from western Canada), oil (from Alberta and Saskatchewan), sugar (from Latin America), and coal (from Pennsylvania).
(i) Toronto Island is used for recreation and as a site for a small airport.
(j) From downtown Toronto the Island airport is reached by cable ferry.

P. 60 The domestic shipping season is longer than the overseas season because the Gulf of St. Lawrence is closed by ice before the inland waterways freeze over.

P. 62 The major oil refineries are located at Port Credit and Clarkson. Natural gas is also brought from Alberta.

P. 62 What sources of power are available to Southern Ontario?
1. (a) Toronto obtains electricity from hydro plants at Niagara Falls in eastern Ontario, and from local thermal plants.
(b) The Ottawa and St. Lawrence rivers supply most of the hydro-electric power.
(c) Quebec supplies power to Southern Ontario.
(d) Niagara Falls supplies less power than the combined stations of Eastern Ontario.
2. (a) A tall chimney and piles of coal distinguish a thermal from a hydro-electric plant.
(b) The Lakeview plant is in a waterside location on Lake Ontario.
(c) This site can easily receive coal transported by boat.
(d) Coal, appearing in piles at the right of the photograph, is used in this plant. It probably comes from Pennsylvania and is imported by "lakers." These vessels are very long with many open hatches for rapid loading and unloading.

P. 64 Electricity is required for factories, heating, lighting, transportation, and various domestic purposes.

P. 64 The area is approximately 1¼ miles long. The Don River Valley provides a route for the railway.

P. 66 The central location has advantages of established transportation routes to bring in raw materials and labor and to export the product. Close contact with other concerns such as advertising agencies or sub-contractors may be important.

P. 68 Such an intersection makes travel safer by maintaining one-way traffic and establishing crossings by overpasses. It requires a large area of land and may encroach on valuable farmland.

P. 68 The subway system reduces the number of cars in downtown Toronto.
Some reasons for Toronto's growth into the largest city in Southern Ontario are its importance as a port, transportation centre, manufacturing centre, and regional capital.

P. 70 Marmora lies north-east of Peterborough.

P. 71 Concentrating helps lower transportation costs because much of the waste material is left behind at the mine. Belleville is located on a bay in Lake Ontario between Toronto and Kingston.
Barrie and Orillia are on Lake Simcoe.
Oakville lies west of Toronto.
The boundaries of Southwestern Ontario are: Lake Huron, Lake Erie, and the Niagara Escarpment.
The land is being used for crops and a large barn and silo indicate that stock are also important.

P. 72 The Grand River has its outlet in Lake Erie.

P. 72 The Grand River follows a gently winding course in a generally east-west direction.
The park is about two miles long and a quarter to half a mile wide. Facilities include camping and picnicking grounds, bathing, a playing field, and scenic routes with points of special interest.
Visitors can learn about land use and reforestation practices.

P. 75 A summary of tobacco farming in Southern Ontario
1. Tobacco requires well-drained sandy soil. It requires adequate rainfall to promote spring growth but limited rainfall during the summer ripening season. Frost is a serious hazard.
2. Tobacco has exacting climatic and soil requirements and is a very "greedy" crop requiring large quantities of fertilizer to maintain the fertility of the soil. Erosion of the sandy soil can be a serious problem.
3. May is seeding and transplanting time. Spraying and thinning continue until harvesting begins in August.
4. (a) A kiln is a building for drying tobacco where temperature and humidity are carefully controlled.
(b) Fig. 2-49 shows racks for hanging tobacco inside the kiln, holes for ventilation, and large doors or windows through which the tobacco enters and leaves the kiln.
5. In 1950 his total receipts for tobacco were $2362.25.

P. 76 Figure 2-50 shows the harvesting of sugar beets. The land is flat and intensively cultivated.

P. 76 The climatic graph of Windsor
1. The growing season is 179 days. This is longer than in the Niagara Fruit Belt.
2. (a) The January average is 28°F.
(b) Three months have average temperatures below freezing. This is one month less than Ottawa.
3. Summers are very warm.
4. The total annual precipitation is 33.4 inches. This is almost the same as Ottawa but the latter has a much greater proportion of snow because winters are longer and colder there.
5. About nine inches occurs during the height of the growing season. The precipitation is evenly distributed throughout the year.

P. 77 Fig. 2-52 shows gullying caused by heavy spring rains on exposed soil. Where the cover crop was planted the roots have held the soil in place and little erosion has taken place. The trees in the picture are leafless but there is no snow on the ground: this suggests spring.

P. 78 More than half of the crop is marketed in Ontario. Quebec is the second most important market.

P. 80 How has Kitchener grown during a century?
1. The population in 1950 was 55 times that of 1852.
2. (a) Kitchener added the least number of people in the decade 1930-1940.
(b) The greatest number of people was added in the decade 1950-1960.

3. (a) 1940-60 rate of growth was more than twice as rapid as the 1920-40 rate.

P. 80 London is 117 miles from Windsor, 113 miles from Toronto, 67 miles from Hamilton. Sarnia is due west of London. Highway 401 passes south of London.

P. 82 How is modern town planning helping to improve London?

Note: This is one of several studies of urban renewal and urban improvement that will be found in this textbook. As such, it is closely related to the theme of conservation. Most Canadian children now live in towns and cities. It is important that they gain some understanding of the importance of improving the urban environment. They must be led to realize what a complex and difficult problem this poses. The social, economic, and political implications must be carefully and objectively studied.

1. The Thames meanders through the city.
2. (a) Clarence Street contains the largest number of old buildings.
(b) The plan will remove industrial areas from this district.
(c) Apartments and terrace houses will replace demolished buildings. This should result in an increased population.
(d) Commercial land is that devoted to shops, service operations, etc. The commercial area will be extended to serve the new housing areas.
(e) People may work in the commercial area — store clerks, garage mechanics, dentists, etc., the hospital, or the local industrial development on South Street.
3. Extensive new parklands will be developed along the Thames River and each residential block will have a small area of park.
4. At the north end of the bridge there is a small area of parkland on each side. For the remainder of the way to Simcoe Street there are industrial buildings on the left and commercial properties on the right.
(b) For the first block on Simcoe there are commercial buildings on both sides. Just before the Clarence intersection these give way to the grounds of the school on the left and terrace houses on the right. Wellington Street presents a mixture of commercial properties and terrace houses until, close to the river, an apartment building rises on the right and the hospital on the left. The walk along Wellington St. is in a southerly direction.
(c) Total distance covered is about three quarters of a mile.

P. 83 St. Thomas lies south of London. Woodstock is northeast of London.

P. 83 Sarnia — an important international border point

1. (a) Canada and the United States are clearly indicated on opposite sides of the boundary. Customs houses appear on the Canadian side.
(b) The St. Clair River serves as the boundary.
(c) The river is flowing south.
(d) The river is about half a mile wide.
(e) Port Huron is in Michigan.
(f) The river connects Lake Huron with Lake St. Clair.
2. Sarnia is about 600 feet above sea level.
3. There are few contours, widely spaced. Roads and railways are straight and there is a definite grid pattern.
4. (a) The grid pattern is prominent.
(b) Houses are built close to the roads.
(c) East-west roads are more densely settled than north-south roads.
(d) The green patches are woodlots at the backs of farms, in the least accessible areas.
5. (a) The built-up area extends over about four square miles.
(b) Oshawa.
(c) Oil tanks, oil refinery, and pipelines all appear on the map.
(d) Road, rail, boat, and pipeline can be used to move oil.
(e) The main industrial area is southwest of Sarnia.
(f) Golf courses and a cemetery appear north of the city.
6. The residential area is growing east. It is blocked from growth in other directions by Lake Huron, the river, and the industrial areas.
7. (a) The camera is pointing south.
(b) The waterway, roads, and railways are visible in the picture.
(c) Oil refining is evident in the photograph.
8. (a) Port Huron is about the same size as Sarnia.
(b) Port Huron is a U.S. border crossing point, port, road and rail centre, and local centre.
(c) Detroit-Windsor, Sault Ste. Marie, Niagara Falls.

P. 86 Windsor — Canada's fifth manufacturing city

1. The Great Lakes-St. Lawrence Lowlands is the most densely populated section of Canada.
2. Windsor is the most southerly of Canadian cities.
3. Serviced sites would be those with such facilities as electricity, gas, piped water, roads, or railways.
4. Windsor is on the Detroit River and thus on the Great Lakes-St. Lawrence Seaway route.
5. Detroit is opposite Windsor.

P. 87 Windsor cannot expand westward because of the Detroit River and beyond it the United States.

P. 87 A large single-floor organization is the easiest way to move labor and goods especially when the product, automobiles, is both large and complex. Windsor is closely associated with the development of the automobile industry in Detroit. Its position as a favored transportation centre has assisted its growth as an industrial city.

P. 88 More people are engaged in non-manufacturing occupations than in manufacturing. Such jobs include personnel directors, doctors, teachers, insurance agents, builders, bus drivers, telephone operators, sales clerks, stenographers, garage mechanics.
P. 90 "Automation" means providing machines to do work now done by people. This may include operating equipment. Increasing population requires increased services and promotes the expansion of non-manufacturing industries.
P. 90 Other tourist attractions in Eastern Ontario include the St. Lawrence Seaway, Upper Canada Village, the Rideau Lakes, and the historic cities of Kingston and Ottawa.
P. 90 A topographic map of part of the Ottawa Valley

Note: See also the exercise on pages 94-95 and on page 162 for further analysis of this map.

1. The Ontario section is on the south side of the valley.
2. The average elevation is 300 feet.
3. Few, widely-spaced contours, many straight roads, and railway lines, and areas of peat bog are reasons for believing this land is flat.
4. There are 20-30 small villages.
5. Markets include Ottawa, Hull, Montreal, Brockville, Cornwall, Kingston.

P. 91 The site and functions of Kingston
1. (a) Lake Ontario is south of the city centre.
(b) The Cataraqui River flows into Lake Ontario at Kingston.
(c) The St. Lawrence River flows out of Lake Ontario at Kingston.
2. Montreal is north-east (175 miles), Ottawa north (100 miles), Toronto south-west (162 miles) of Kingston. This central position amid the main cities of Canada makes Kingston a busy route centre. It is also sufficiently far from these large cities to be a regional capital in its own right, as suggested in the last paragraph on page 91.
3. The main railways and Highway 401 pass north of the city centre.
4. Royal Military College and Queen's University are shown.

P. 92 Cheap electric power is available from the International Rapids section of the St. Lawrence Seaway.
Water is available from the Cataraqui River and from Lake Ontario.
It is well situated with regard to markets because it is within easy reach of the urban centres of Ottawa, southern Ontario, and southern Quebec.

P. 93 A summary of Kingston
1. Service functions are those providing services for the population: e.g. shops, garages, and professional services such as doctors and lawyers. Industrial functions create an end product such as aluminum smelting, paper making, automobile manufacturing. Service functions are very important at Kingston because of the large non-industrial population associated with the colleges, etc. Kingston has industrial advantages of cheap power, plentiful water, and a strategic location in the centre of the Great Lakes-St. Lawrence Lowlands area.
2. Problems in replanning include expense, problems of relocating established people and industries. Planning aims to make the most efficient use of available land and to preserve places of scenic or historic value.

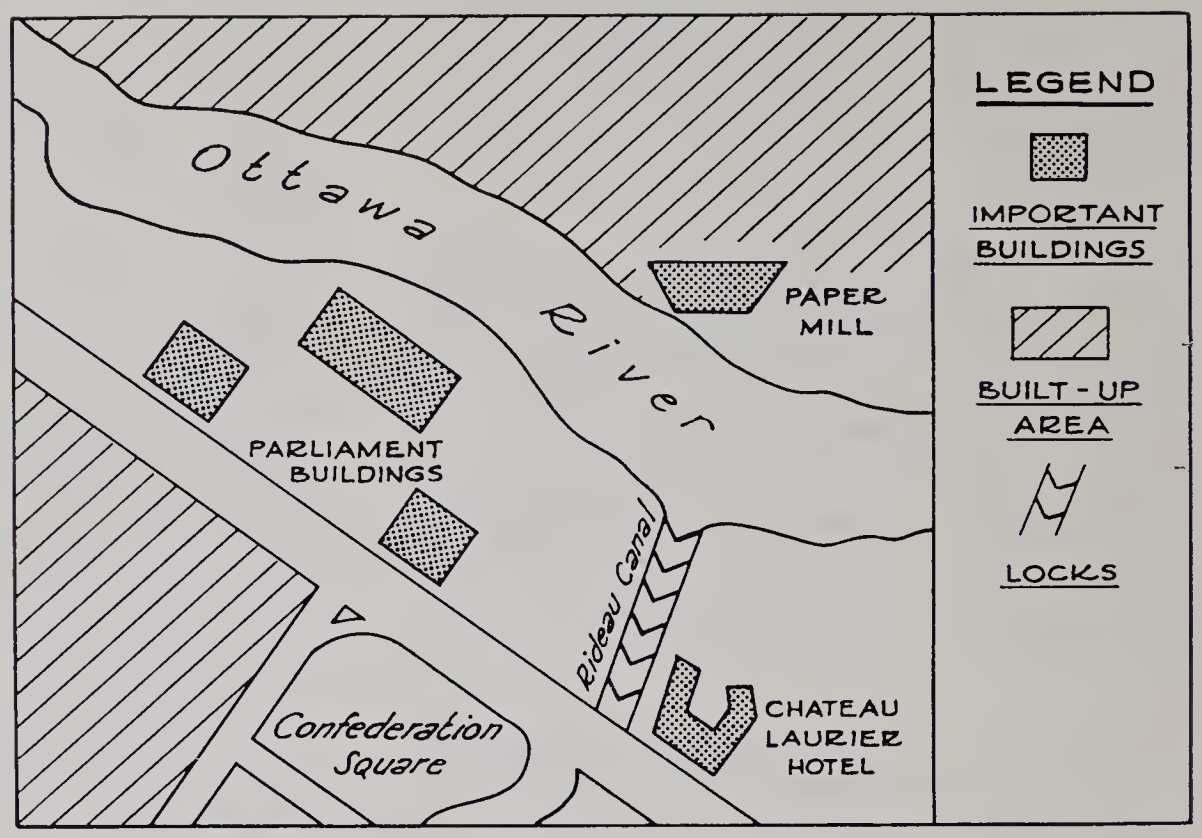
P. 93 The St. Lawrence River is visible in the distance. New York State is located beyond. The main C.N.R. line runs north of the city, away from the river banks.
P. 94 Piles of pulpwood are visible beside the mill. New industry and population have been attracted to Cornwall because of improved water transportation facilities and a greater supply of available power.
P. 94 The site and surroundings of Ottawa

Note: Recent issues of the *Canada Year Book* contain useful material on the National Capital Plan. A good reference work is *The Queen's Choice* by Wilfred Eggleston, available from the Queen's Printer, Ottawa.

1. (a) The scale is 1:250,000. One quarter of an inch represents a mile.
(b) 45 square miles are shown.
2. (a) The Ottawa, Gatineau, and Rideau rivers meet at Ottawa.
(b) Dams and rapids on the Gatineau and Rideau, extensive rapids on the Ottawa suggest that these rivers are a source of power.
3. (a) Ten railway lines radiate from the city.
(b) Eight major roads radiate from the city.
(c) Car routes are 17 to Montreal, 15 to Kingston, 15 to Toronto, 17 to North Bay.
(d) Ottawa is 120 miles from Montreal, 259 from Toronto.
(e) Uplands airport is south of Ottawa on the east bank of the Rideau River.
4. Hull is located opposite Ottawa. The countryside on this side is mountainous, heavily wooded, with many swift streams and lakes. This is part of the Province of Quebec.

P. 95 The area is 400 square miles. The Green Belt is about 28 miles long and averages three miles in width.
Extensive areas of land for future urban development are found on the north bank of the Ottawa.
Gatineau Park is northwest of Ottawa on the west side of the Gatineau River.
The new railway terminal is on the east side of the present built-up area.
P. 98 Ottawa has developed a tourist industry

P. 99 Sketchmap of the area shown in Figure 2-66. (See P. 99, item 1 below.)



because of its national buildings — Parliament, museums, etc., and its scenic parks.

P. 98 Ottawa has a longer, colder winter than St. Catharines with much more snow. To the south and west conditions become milder and the growing season longer. This permits the growth of such crops as tobacco and peaches which do not thrive in Eastern Ontario.

P. 99 Ottawa — a review

1. (a) A — Parliament Buildings, B — Rideau Locks, C — Hull, D — Ottawa River.

Suggested pupil's exercise: Make a simple sketch-map of the area shown in Fig. 2-66. Indicate — Ottawa River, Parliament Buildings, Rideau locks, pulp mill.

Drawing at the top of this page will suggest the kind of map to be done.

(b) E is a pulp and paper mill, special product matches.
(c) Rideau Hall was visible to the right of the area shown.
2. Ottawa has a high percentage of people engaged in service occupations because there is a very large proportion of its population employed by the Federal Government.
3. Ottawa has grown more slowly than Toronto because it does not have all the industrial and location advantages of the latter.

P. 99 Reviewing the Industrial Heartland

1. 1 — Niagara
   2 — Southwestern Ontario
   3 — Niagara
   4 — Eastern Ontario
   5 — Southwestern Ontario
2. 1 — Toronto
   2 — Windsor
   3 — Hamilton
   4 — Toronto
   5 — Sarnia

3. (a) Supplies of electricity from the Great Lakes-St. Lawrence system while vast, are insufficient to meet the needs of the rapidly expanding urban-industrial areas of Southern Ontario. Thermal power is easily available from imported coal and can also be produced from western oil and natural gas which now flow into the region. It should also be noted that hydro-electricity from Northern Ontario is not as easily accessible to Southern Ontario as often supposed and that coal-based thermal power is competitive with it.
(b) Tradition and skilled workers maintain the industry using imported raw materials.
(c) Transportation, labor force, and established connections with other industries are important.
(d) Every person requires service industries.
(e) Refer to the example of Oshawa.

4. (a) Kingston: plans have been made to make best use of Kingston's land, to preserve its beauty and historic assets.
(b) London: plans exist to control pollution and develop scenic attractions of Thames Valley. This will also assist in overcoming London's shortage of pure water.
(c) Toronto and Hamilton: industrial sites are available in prized locations on the waterfront.
(d) Norfolk County: tobacco is being grown on sandy soils, controlling erosion and producing wealth.
(e) Grand River Valley: recreation areas established with demonstration areas in conservation.
(f) Niagara Fruit Belt: no adequate measures are yet being taken but the problem is being studied. Intelligent planning could save the best peach soils in Canada from being used for other purposes.
(g) London: plan will remove ugly, inefficient

buildings, increase use of land, and provide additional parkland.
(h) Niagara Falls: a tourist industry and recreation area developed without losing power potential of falls.
(i) Ottawa: National Capital Plan will control building, provide national buildings and parkland areas.
(j) Southwestern Ontario: cover crops such as winter wheat stabilize soil and produce wealth.

P. 101 5. Through discussion, the teacher should assist the pupils to develop a few major generalizations concerning the geography of Southern Ontario. These generalizations should grow out of the detailed studies that have been made in the chapter. Begin with reference to the population of Ontario (see Table 1, page 486). What proportion of Canada's population is this? *Most* of these people live in Southern Ontario. Now refer to the questions on page 18. In answering the first question, consider such factors as location, history of settlement, relief, soils, waterways (natural and man-made), power resources, proximity to the United States, etc. These ideas can be extended as Question 2 on page 18 is discussed. Many Ontario manufacturing enterprises are branches of United States plants. Southern Ontario may be viewed in some ways as an extension of the great American Manufacturing Belt (see White and Foscue *A Regional Geography of Anglo-America,* Prentice-Hall Inc.). The role of Canadian tariff policy in the development of manufacturing should also be considered. In answering Question 3, page 18, refer to Chapter 11 for information on agriculture in Canada as a whole. Note that in 1961, Ontario contained nearly one quarter of Canada's occupied farms. More than 90 per cent of these were located in Southern Ontario. The requirements of a dense population and favorable factors relating to relief, soils, climate, etc. are points to be brought out in answering Question 3, page 18. The role of specialization in agriculture should also be considered. For which specialized products is the region famous? Why have these specialties developed? To what extent are these products sold outside Ontario?

P. 101 6. (a) Southwestern Ontario.
(b) Manitoulin Island.
(c) Thousand Islands — See Fig. 2-8.
(d) Beauharnois, International Rapids, Niagara.
(e) Thames, Grand, Madawaska, Gatineau, Richelieu, St. Maurice, St. Francis, Chaudière.
(f) The Appalachian Region, Great Lakes-St. Lawrence Lowlands, Canadian Shield.

CHAPTER 3 NORTHERN ONTARIO

P. 103 There are 11 districts in Northern Ontario. Port Arthur, Fort William, Sudbury, and Sault Ste. Marie are the largest cities.
Note the two major questions on page 103 on which this chapter focuses. Figure 3-2 anticipates one of the major economic factors that the pupils will discover in their study of Northern Ontario. The province accounts for 40% of Canadian mineral output (by value). Most of this mineral wealth comes from Northern Ontario. Ontario's share of the national output compares with the total of 33% contributed by Quebec and Alberta together.
P. 104 Fig. 3-3 shows an area of rough, rolling land. The rocky nature of the land, forest cover, poor soil, and harsh climate make farming unprofitable. The landscape in Fig. 3-4 is one of low relief, rocky ground, rough forest cover, and a vast number of small lakes.
P. 105 This is coniferous forest whose chief value is for pulp and paper.
P. 108 Nickel, copper, platinum, and silver have been mentioned.
P. 110 A ton of silver ore was worth $4560 in 1903.
P. 111 Towns in this area are located along the railway or on short branch lines.
P. 113 Lead, zinc, and silver are also produced at Manitouwadge.
P. 113 A review of mining in Northern Ontario
1. (a) Nickel — Sudbury — to strengthen steel and aluminum.
Copper — Sudbury — piping.
Gold — Timmins — bullion.
Platinum — Sudbury — jewellery.
Iron ore — Atikokan — steel.
Silver — Cobalt — coinage.
Cobalt — Cobalt — alloyed in steel.
Uranium — Blind River — nuclear reactors.
(b) Nickel is the most important metal.
Nickel plus copper account for 66%.
(c) Gold is the third most important mineral product.
(d) Iron ore is next in importance to gold.
2. The transition zone around North Bay shows features of Southern Ontario and also many

characteristics of the Canadian Shield.
3. Open-pit mining scoops up ore from the surface. In underground mining, shafts, tunnels, and pits are used. Open pits — Atikokan. Underground mines — Sudbury.
4. Mining has led to deforestation for fuel, construction, and pit props. Fumes have destroyed vegetation. Heaps of waste material cover the landscape. Farming areas have been established where possible. Destruction of the forest by lumbering and fumes has led to problems of water control, fish and game reserves, loss of recreational areas.
5. The Clay Belt has much more land under cultivation than the surrounding Shield.
6. Gold mining communities face problems of fluctuation in value of their product. This is aggravated by the fact that they are often dependent on gold as their only product.
Note that this review helps to answer the two questions that were raised near the bottom of page 103 at the beginning of the chapter.

P. 114 Why is Kapuskasing an important centre of Northern Ontario?

This sample study introduces the next major topic in the study of Northern Ontario. Through a detailed study of the forest industries around Kapuskasing, the pupils will be led to some understanding of the geography of these industries throughout the whole vast region.
1. (a) There are four piles of pulpwood.
(b) Railways transport the product to market.
(c) Regular fields and straight lines of trees testify that the land is not in its natural state.
(d) The wind was blowing from the north, as indicated by the smoke from the mill.
2. (a) A — Paper mill.
B — Kapuskasing River.
C — Experimental farm.
(b) Kapuskasing has a regular street pattern.
(c) Power is supplied by the Kapuskasing River.
(d) The land is level to gently rolling.
(e) It is used for cultivation and for woodlots.
(f) Road and rail transportation is indicated on the map. An airstrip is also shown.
(g) The river is used for power, for water for the mill, for the city water supply, and for recreational purposes. It flows north before reaching the dam. It has its outlet in Hudson Bay.
3. (b) Kapuskasing is north of the railway line. Freight reaches Toronto via North Bay.
(c) The airport (unidentified) is shown west of the city. The distance from Toronto is approximately 450 miles.
(d) The elevation is about 750 feet above sea level.
(e) The 750-foot contour winds over the map. Benchmarks are shown along the railway at 705 ft. and 738 ft.
(f) The camera was pointing southeast. On the east bank is the mill and on the west bank is the Experimental Farm.
(g) Kapuskasing has local hydro-electric power, a plentiful supply of water for the pulp and paper industry, local lumber, good transportation facilities, local farmland.

P. 117 Fig. 3-15 was taken in winter or early spring. It is coniferous forest. The man is using a power saw. It is a bright sunny day with snow on the ground.

P. 117 Wood is not moved by water from the north because the dams and falls are on this side, indicating that the river is flowing from the south. The single line railway track shown on Figure 3-14 is used to transport logs from the area north of Kapuskasing.

P. 121 Other jobs created by the pulp and paper industry include those in printing and publishing, making paper products, etc.

P. 123 Low, fairly level land, many lakes and marshes, railways, settlement, and absence of roads are evident in the map and photographs in Figures 6-35 and 6-36.

P. 124 Northern Ontario's Forest Industries — a summary

Note this exercise as a good example of how, in the inductive approach to geography, the major generalizations emerge at the end. From what has been learned in the preceding detailed sample studies, using a wide variety of materials, the pupils should be able to answer the questions in the summary. In doing so, they are led to draw their own conclusions and to master the major concepts which are supported by a mass of realistic, accurate detail.
1. Waterside location provides water of which vast quantities are necessary in the processing and transportation of logs, and possibly for power.
2. Damming rivers enables full advantage to be taken of the swift flowing streams as sources of power; it raises the water level and facilitates the movement of logs.
3. The lakes were formed by ice hollowing out rock basins and by glacial deposits damming the streams.
4. Production of hydro-electricity is favored by the numerous swift flowing rivers and lakes. Natural storage basins and snowfall help maintain a steady supply of water.
5. Pulp and paper is Canada's chief export and enables Canada to buy other goods from other nations.
6. (a) "Controlled cutting" means selecting only those trees of proper age, size, and quality for felling.
(b) Conservation problems include fires, insects, diseases, maintaining usable timber, stream pollution.

(c) Government measures include fire lookouts, public education and advertising, protecting trees from insects and disease, speeding growth of trees, purifying polluted waterways, controlled cutting, and seeding.
7. The Hudson Bay Lowland has a severe climate, poor soils, and inadequate drainage. It is remote from the main centres of population.

P. 125 The climate of Kapuskasing

1. (a) The January average for Kapuskasing –1°F. The January average for Windsor +25°F.
(b) 6 months below freezing at Kapuskasing. 3 months below freezing at Windsor.
2. July average at Kapuskasing is 61°F.
3. Frost-free season at Kapuskasing is 83 days. Frost-free season at Windsor is 169 days.
4. (a) Total annual precipitation is 27.99 inches.
(b) The wettest months are the growing months. Warm, wet days are favorable to agriculture. Precipitation at St. Catharines and Windsor is more evenly distributed throughout the year.
(c) This is much more snow than Windsor gets.
5. Kapuskasing has long, cold winters and short, warm summers.
Precipitation is low and is evenly distributed throughout the year with a summer maximum.

Note: From this study of the climatic graph, some generalizations may be made (as in Question 5) about the climate of much of Northern Ontario. The comparison between Kapuskasing and Windsor permits some broad contrasts to be made between the climate of Northern Ontario and that of Southern Ontario. These contrasts may be discussed briefly with the pupils.

P. 125 Lower temperatures reduce the rate of evaporation because cool air can hold less water vapor than warm air.

P. 127 What are the general features of the climate of Northern Ontario?

This exercise sums up the main ideas discussed on pages 125-127. The concept of the isotherm map (Figure 3-22) must be explained very carefully.
1. January temperatures fall steadily as one moves northward. All of Northern Ontario has January averages below freezing.
2. In July temperatures generally decrease northwards.
3. Rainfall decreases northwards.
4. (a) The shortest frost-free season is northeast of Lake Superior. This is an area of higher elevation which reduces temperatures.
(b) The longest frost-free seasons are on the shores of the Great Lakes.

P. 130 Why is Sault Ste. Marie a major centre of Northern Ontario?

1. (a) Iron ore comes from the Steep Rock area. It is transported by lake freighters.
(b) Rail and road transportation is also available.
(c) The plant is on the west side of the city.
(d) Value and volume of production are considerably less than that at Hamilton, but the two cities between them produce more than 70 per cent of Canada's primary iron and steel.
2. A paper mill is also indicated.
3. (a) Three canals are used to by-pass rapids in the St. Mary's River. These canals carry more goods in a typical year than those at Panama and Suez combined.
(b) The harbor is on the east side of the city.
(c) The difference in elevation is 21 feet.
4. (a) Michigan is located to the south.
(b) Automobiles reach the U.S. by the International Bridge.
(c) This is not as busy a border point as Sarnia and Windsor because it is in a less densely populated region.

P. 131 Using a photograph and a map to explain the importance of the Lakehead

1. Port Arthur is north of Fort William.
2 Major cargoes include wheat, coal, oil, pulpwood, paper, cement, and iron ore.
3. Industries include – flour milling (grain from the prairies), oil refining (oil from Alberta), cement making, paper making (pulpwood from Canadian Shield inland), shipbuilding, transportation equipment.
4. (a) Many railways criss-cross these ports and branch lines carry freight cars alongside elevators.
(b) Grain is brought by rail from western Canada. Manufactured and processed goods are brought by rail from the Great Lakes-St. Lawrence Lowlands.
5. (a) Breakwaters have been built to provide protected anchorage in times of storms. Storms as severe as those at sea can occasionally occur on Lake Superior.
(b) A dredging company exists to improve the channel.
7. The camera was pointing north.

P. 132 Iron ore comes from the Steep Rock area, west of Lake Superior, by boat.

P. 132 The Nipigon River drains from Lake Nipigon to Lake Superior. Saw-milling is carried on in this area.

P. 133 From Toronto to Kenora is a journey of about 875 miles. From Kenora to Winnipeg is about 160 miles.

P. 133 Summarizing Northern Ontario

1. (a) This is a vast area with few settlements or roads. Map surveys are incomplete and it is an inhospitable land in which to be lost.
(b) Fishing is good because of the immense number of unpolluted rivers, streams, and lakes.
(c) Canoe is the best means of travelling short distances; aeroplane long distances.
(d) Other activities include hunting, hiking,

canoeing, camping, nature study.
(e) Parks are larger and more numerous in Southern Ontario because of the large population requiring recreational facilities.

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2. (a) **Southern Ontario**	**Northern Ontario**
About one tenth the size of Northern Ontario.	
Dense rural population and many cities.	Very thinly populated and few cities.
Longer growing season.	Long, harsh winters, short, warm summers.
Original vegetation of mixed forest largely removed.	Covered with coniferous forest often of mediocre quality.
Rich farmlands and great industries of all kinds.	Forests, mineral wealth, water power, recreation areas.
Large variety of occupations.	Lumbering, mining, some limited farming.
Dense road and rail network.	Few roads and railways.

(b) **Southern Ontario**	**Northern Ontario**
Rich farmland, various crops, many farms, livestock.	Very little farmland.
Many small patches of mixed woodland.	Limitless areas of coniferous forest.
Limited wildlife.	Big game and wildlife.
Large, slow moving rivers.	Swift streams, many lakes.
Many buildings, fences, roads, railways, etc. Many large cities.	Little sign of human occupation. Few cities.
Some HEP and some thermal stations.	Isolated mines. HEP sites.

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3. Southern Ontario is much more densely populated. Northern Ontario is likely to remain sparsely populated because it is remote, has harsh climate, very limited agricultural areas.
4. (a) Distance, severe climate, and remote location are problems very evident in Northern Ontario.
(b) Northern Ontario contributes minerals, pulp and paper, hydro-electricity, and recreational facilities to the wealth of the Canadian people.
(c) Forests are the greatest renewable wealth of Northern Ontario. Control of disease, insects, fire, and exploration must be undertaken to maintain these resources. Minerals are not renewable. These can only be preserved by careful exploitation, avoiding waste, and prospecting for other deposits.
(d) Forest and mineral products comprise the main exports of Northern Ontario. The bulk of these go to the United States, the United Kingdom, the leading European countries, and various countries in Africa and South America also comprise important markets. Newsprint, lumber, and wood pulp are the main forest products exported. Mineral products, including both ores and concentrates, exported include uranium, nickel, copper, iron ore, asbestos, lead, zinc, and silver. Some of these, notably copper and nickel, are exported in semi-fabricated form as well (e.g. as sheet, tubing, etc. in the case of copper).

CHAPTER 4 THE PROVINCE OF QUEBEC

P. 134 It is a stone house with steeply gabled roof, dormer windows, end chimneys, and a central doorway.
The tanks are for storing oil and give evidence of an oil refining industry.
Tanks are located near the river so that oil tankers may be used for transporting crude or refined oil.
P. 135 An old house and a modern industry reflect these features.

P. 136 What impression did Canada make on the first French explorer?
1. The Canadian Shield is described in the first extract. The soil had been removed by ice.
2. Cartier considered the land near Quebec to be fertile because it supported mixed forest.
3. Maize or Indian corn was the food of the Indians.
P. 137 The canal system of the St. Lawrence Seaway makes such a voyage possible.

Champlain travelled west via the Ottawa River.

P. 137 The early pattern of French settlement in Quebec and its effect on the landscape today

1. Boucherville is on the south shore of the St. Lawrence opposite Montreal Island.
2. (a) The houses were located along the roads.
(b) The fields are long, narrow strips running back from the river. The advantage of water frontage was for transport.
3. Parallel roads divide the ranges and one range road links them with each other and with the main road at the waterfront.
4. (a) The camera was pointing northeast.
(b) Verchères is strung out along the river road.
(c) The land is flat and almost all of it is cultivated.
(d) Montreal provides a large market for the products.
4. The land is flat; most of it is cultivated; villages are located on the river banks and are strung out along the roads; farms consist of long, narrow fields running back from the river.

Note: The pattern of settlement described in the above exercise should be contrasted with that for Ontario (as studied in Chapter 2) and with that for the Prairie Provinces (Chapters 6, 7, and 8).

P. 139 Mr. Brault's farm lies southwest of Montreal.
It is 20 miles from the city.

P. 140 The main features of a modern French-Canadian farm near Montreal

1. (a) Many large buildings in good repair suggest a large, prosperous farm.
(b) Large barns and a silo suggest stock raising.
2. (a) The land is flat.
(b) The fields are long and narrow which is typical of Quebec farms. Ontario farms are more compact, more square-shaped.
3. The total acreage is 260 arpents or about 208 acres. The long narrow fields resemble the old seigneurial pattern.
4. Dotted lines represent ditches. Very low lying land near the St. Lawrence is subject to flooding.
5. Sources of income include dairy produce and poultry (chickens and turkeys).
6. (a) Grass, clover, and alfalfa use up most of the acreage.
(b) Oats, barley, sweet corn, and peas are the chief cash crops.

P. 142 Flood and drainage problems result from the low elevation.

P. 143 A topographic map of the Montreal plain and a vertical aerial photograph

1. (a) The contour interval is 25 feet.
(b) The land is flat.
(c) The fields are long and narrow, in parallel strips. The pattern is similar to that already noted on pages 137-139.
(d) Settlement is almost continuous along the main roads. Marieville is the only nucleated village. The others are strung along the roads.
(e) Marieville is the most important settlement. It is at the crossing point of two main highways.
(f) Route 1 leads to Montreal.
(g) The rural settlement is dense. Rich farmland and proximity to a large city attract people.
2. (a) Roads curve to avoid the mountain.
(b) The road is 200 feet above sea level where it crosses the mountain.
(c) Mount Johnson reaches 750 feet.
(d) The distance is 6 miles. The mountain appears as a conical hill rising sharply from the plain.
(e) Very close, nearly circular contours show that Mount Johnson is very steep and cone-shaped.
(f) The area covers approximately one square mile.
3. (a) The photograph shows that the land is divided into fields and cultivated.
(b) The wooded areas lie at the backs of the farms in the areas least accessible from the roads. Mount Johnson has not been cleared because of the steepness of the slopes.
(c) Gravel is available from pits.
(d) The map shows 1¼ inches for every mile. This is a smaller scale than the photograph. We can tell this because Mount Johnson looks considerably larger in the photograph.
4. (a) There are 8 hills.
(b) They extend east from Montreal.
(c) Mount Royal is on Montreal Island.
Three hills are visible in Fig. 4-19.

Note: The profile diagram at the bottom of page 145 should be explained very carefully. This will be referred to again in later chapters when pupils are required to draw profiles themselves.

P. 147 Location on the slopes protects trees from frost when the cold air drains down into the hollows.
69.25 acres are devoted to forage crops.
The Brault farm is also mainly devoted to forage crops but of different varieties.

P. 150 Dorval airport is west of Montreal.

P. 150 The Ottawa highway follows the Ottawa Valley, that to Quebec follows the St. Lawrence Valley, as does the road to Toronto. New York is reached via the Richelieu, Champlain, and Hudson valleys.

P. 151 Montreal Harbor from a photograph and a large-scale map

1. (a) That this is a busy port is suggested by numerous berths and basins, many vessels, warehouses, and waterfront buildings.
(b) Dumps of coal in the lower right and grain

elevators at left and centre testify to the handling of these products.
2. (a) A — Windmill Point Basin.
B — Bickerdike Basin.
Both basins are less than 35 feet deep.
(b) Note that letter C identifies the entrance to the Lachine Canal. The St. Lawrence Seaway provides a 27-foot channel.
The camera was pointing north. The Seaway Canal is to the east (to the right of the picture in Fig. 4-16).
3. (a) E — Alexander, King Edward, and Jacques Cartier piers. The channel there is 35 feet deep.
(b) D — identifies the St. Mary's Current.
4. Jacques Cartier Bridge appears in the background.

P. 153 A further study of Montreal and its neighboring landscape

1. Meat packing uses meat from Western Canada.
Flour milling uses grain from Western Canada.
Linseed oil plant uses flax from Montreal Plain and Manitoba.
Brewery uses grain from Western Canada.
Salt processing uses salt from Ontario.
Rubber factory uses latex from Malaya.
Textile factories use cotton, wool, synthetic fibres from U.S. and Australia.
Sugar refineries use sugar from West Indies.
Molasses factory uses sugar from West Indies.
Commercial alcohol uses grain from the Prairie Provinces.
Chemical plants use various materials.
Gypsum processing uses gypsum from Nova Scotia.
2. Wheat was imported and exported both as wheat and as flour. Petroleum and chemicals were exported and imported after processing and refining.

Crude petroleum	(a)	(b)	(c)	(d)
Wheat	(a)	(c)	(d)	
Sugar	(b)	(c)	(d)	
Coal	(b)	(c)	(d)	

P. 154 3. (a) The long, low hill is Mount Royal.
(b) The camera was pointing west.
4. (a) The camera was pointing east.
(b) The land is flat except for isolated low hills rising sharply from the plain. These are the Monteregian Hills.
(c) Four bridges connect Montreal with the Mainland.

P. 154 The Brault farm study revealed that the Montreal area has a severe winter climate during which animals must be housed and fed indoors. Short hot summers with occasional droughts were reported. Precipitation of 31 inches of which about one third was snow.

P. 156 Why is the climate Montreal's greatest problem?

1. In the material quoted, the temperature ranged between 15°F. and 30°F. on November 30, 1961. The material here is a further example of the use of first hand descriptive accounts of climatic and other conditions in the teaching of geography. Pupils should be encouraged to collect similar material from newspapers and periodicals.
2. (a) Severe cold closes the navigational channels, and impedes the operation of machinery, slows transportation, increases living costs, restricts outdoor activities.
4. (a) In 1961-2 the Port of Montreal was closed for about 14 weeks — about one quarter of the year.
(b) Halifax and Vancouver are open all winter.
(c) Ice is still a problem after the opening of the channel because shore ice may break up and cause jams.
5. (a) The average temperature is below freezing for four months.
(b) The July average is 70°F.
(c) The total precipitation is 41.8 inches, evenly distributed throughout the year.
6. Living costs are increased in Montreal because of the necessity of heating and insulating homes, vehicles, and stores, and because of snow removal, winterizing vehicles, and the cost of heavy winter clothing. Winter sports are available in Montreal but not in Miami.

P. 157 Beauharnois — and other sources of Montreal's electrical energy

1. The drop is 178 feet.
2. (a) The drop in elevation is 84 feet.
(b) The canal is about 11 miles long. The power house is more than half a mile long.
(c) Beauharnois and Valleyfield are well situated for industrial development because they have abundant cheap power and are located on the main water, road, and rail routes of the St. Lawrence Valley.
3. Montreal receives: oil — from Portland and South America.
gas — from Alberta (south).
H.E.P. — from Beauharnois, Shawinigan, and Bersimis.
coal — from Pennsylvania.

P. 161 The Laurentians — Montreal's Playground

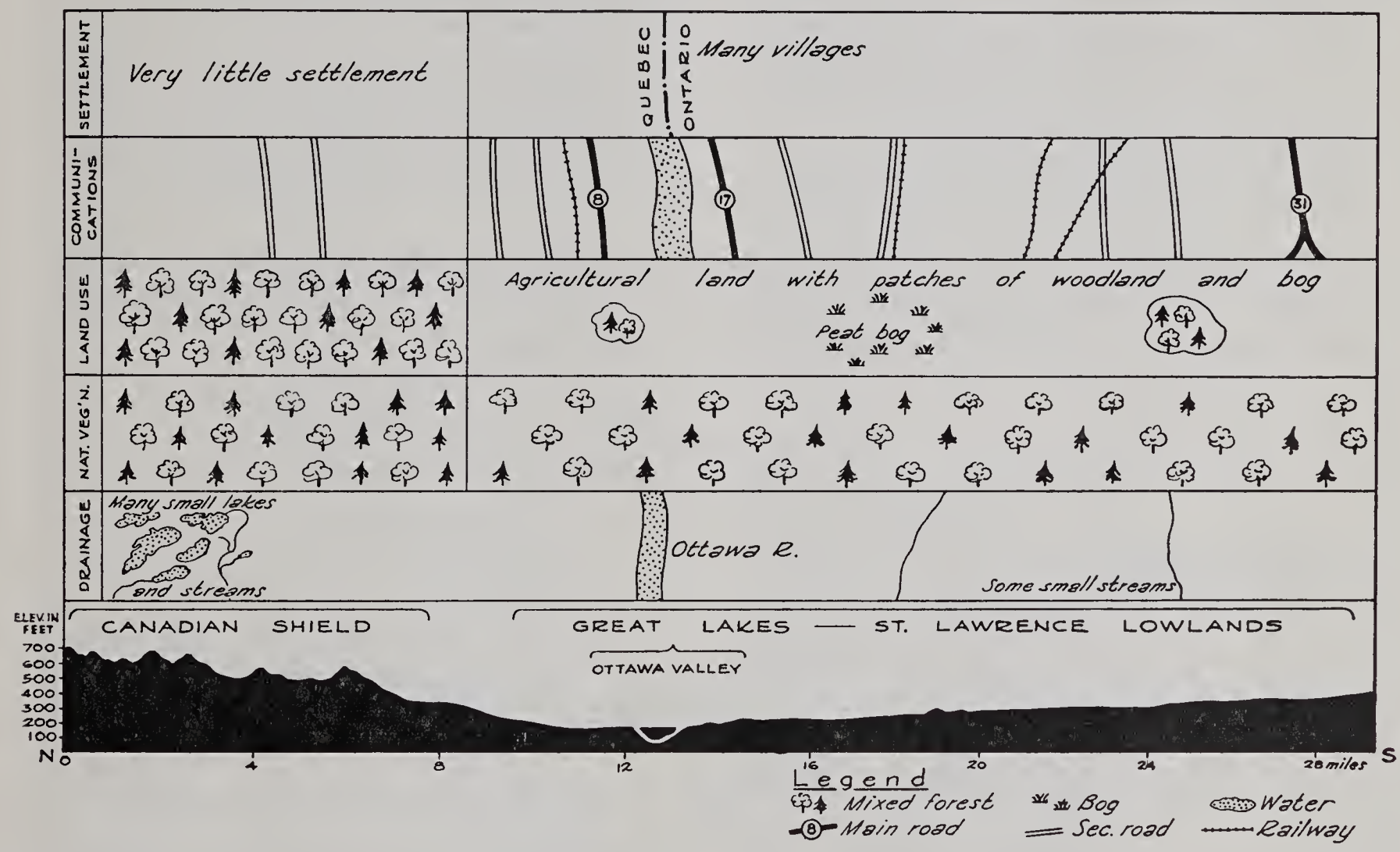
The Canadian Shield lies north and west of Montreal.
The skyline is elevated but generally level.

P. 162 How do the Laurentians differ from the nearby Montreal Plain?

1. Features include rugged country of low relief, thick forest, rocky outcrops, many lakes and rivers, hydro-electric installations.
2. Attractive scenery, vast area, much pure water, fish and game reserves, severe winter climate makes this a good playground arca. It is known as mixed forest because it includes a great variety of trees of both coniferous and deciduous types.

3. This area is used for lumbering and power development.
4. The map shows rugged hill country rising to about 1000 feet, many lakes and streams, thick forest cover. The Lowland was flat, intensively cultivated, and had few lakes.
(a) Highly indented contours, closely spaced, indicate more rugged terrain. 1200 feet is the highest elevation.
(b) The Shield has more forest cover because it has not been cleared for agriculture and settlement.
(c) The Lowland is more densely settled because this is fertile farmland near to the main centres of population.
(d) Roads in the Shield are winding and usually unsurfaced. The network on the Lowland is much denser, follows a rectangular pattern, has many more surfaced roads; more people live in the Lowland, and roads are more easily built on the flat land.
(e) There are more French names north of the Ottawa River; e.g. Jeanne d'Arc, Lac Rheaume.
(f) Natural resources indicated include mountain scenery, power from rapids, forests.

Transect diagrams are particularly suited to the study of areas of contrasting character such as the Hull-Ottawa area or the Vancouver area (p. 382). Such an exercise provides a detailed study of various physical and cultural features along a given section of the map. See example.



P. 162 Transect diagram of the Ottawa extract (Figure 2-60) from Lake Maskinonge to Greely. What contrasts between the Shield and Lowlands are revealed by this diagram?

5. Outstanding features include rugged terrain with considerable settlement near large cities but very little in remote areas; a great deal of surface water; thick forest; much all-year tourist development; power resources and development.

P. 166 How has the St. Maurice River contributed to the growth of Three Rivers?

1. (a) The dam suggests that it is a swiftly flowing river.
(b) A boom prevents logs from interfering with the dam and a chute transports them past the power-house.
2. (a) The St. Maurice is about 250 miles long.
(b) It drops 1400 feet between its source and mouth.
(c) Water is stored in reservoirs.
(d) There are 8 developed sites of which Shawinigan is the largest. There are three undeveloped sites.
3. (a) Handling grain (grain elevators), oil refining (oil tanks), pulp and paper (pulpwood piles) are important industries at Three Rivers.
(b) The St. Maurice is in the far background of Figure 4-31.

(c) Imports include pulpwood, sulphur, oil, wheat. Exports include paper, wheat, oil products.

P. 169 Shawinigan Falls and other towns of the St. Maurice Valley

1. (a) The Shawinigan River enters the St. Maurice from the north at Shawinigan Falls.
(b) The hydro-electric plant is at the junction of these rivers. It is the largest on the St. Maurice.
(c) The St. Maurice averages a quarter of a mile in width in this area.
(d) Industries include making hydro-electricity, aluminum, paper, chemicals, synthetic fabrics, and processed metals. Raw materials include bauxite (British Guiana), pulpwood (Laurentians). Pulpwood is floated down the St. Maurice; imports from overseas reach Three Rivers by boat and travel thence by road or rail.
(e) Water transport cannot be used at Shawinigan Falls because the St. Maurice is too swift and too much interrupted by dams and floating logs. Three Rivers serves as Shawinigan Falls' port.
3. The St. Maurice has provided power and upstream industrial sites which have contributed to the development of Three Rivers.

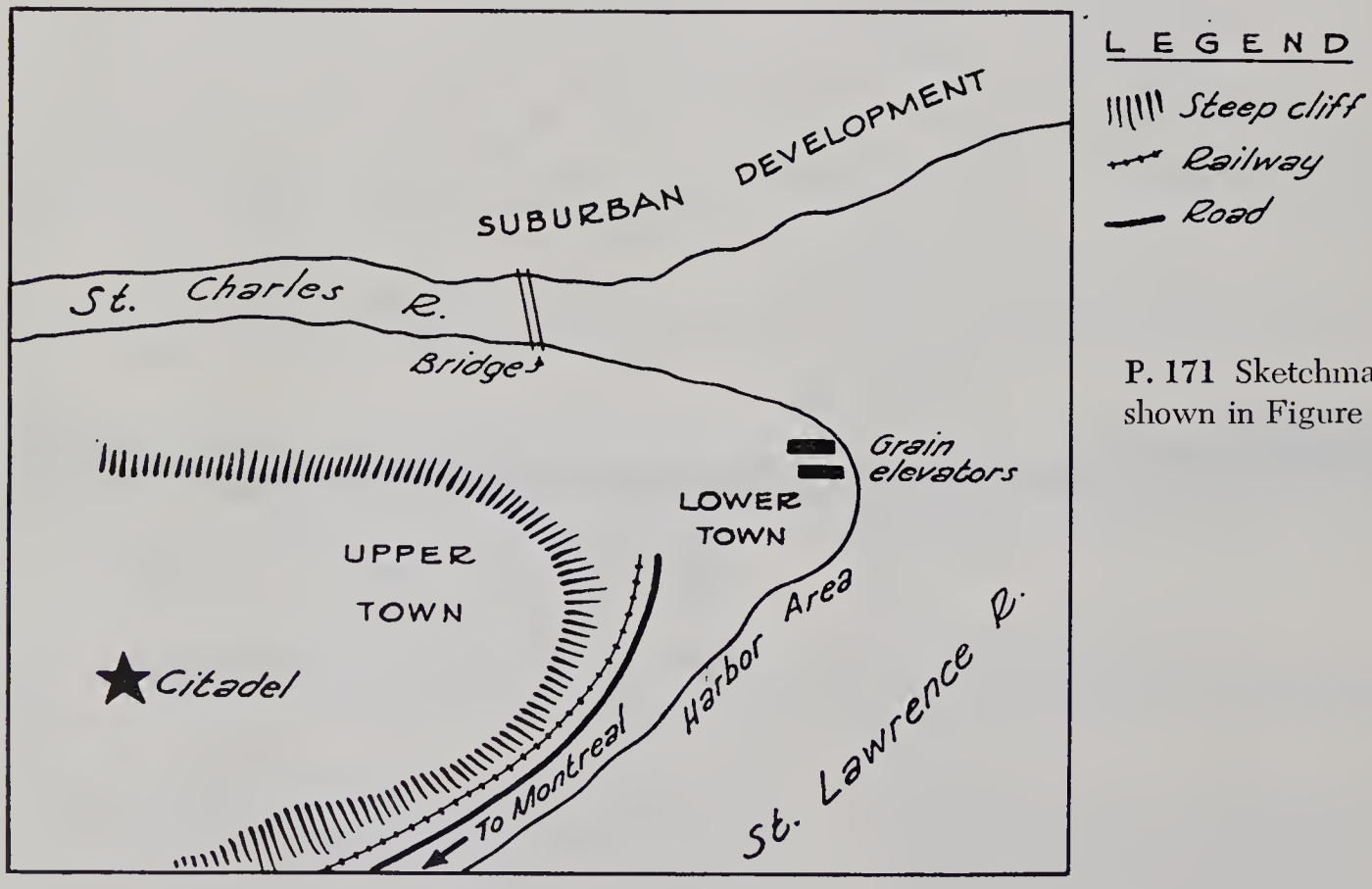
P. 170 How did the site of Quebec appear to two visitors in earlier times?

1. (a) The island was the Isle of Orleans.
(b) He anchored in the St. Charles River. (Identified by letter A in Figure 4-34.)
2. The Canadian Shield is represented by these mountains.
3. The river is ½ mile wide at Quebec, 10 miles wide below the Isle of Orleans.
4. B identifies the Upper Town, C the Lower Town. High cliffs rising from the St. Lawrence plus the St. Charles River on the east made Quebec an easy city to defend.
5. The photograph shows grain elevators and pulp mills.
6. Deforestation and a great increase in the cultivated land and in the size of the city would be the greatest changes.

P. 171 The plain is about 30 miles wide at Quebec.

P. 171 The factory is well located with regard to cheap power, road, rail, and water routes on the St. Lawrence, labor supply from Quebec City.

Suggested pupil activity: Make a simple sketchmap of the area shown in Figure 4-34. The map may then be expanded by reference to a large-scale map (road map, atlas, or topographic sheet of Quebec City).



P. 171 Sketchmap of the area shown in Figure 4-34.

P. 172 Conclusion

Consider long history and consequent early establishment of industries; transportation routes of St. Lawrence Valley; good farmlands; wealth of adjacent Canadian Shield areas – power, lumber, etc.

P. 172 Granby is 45 miles from Montreal. The place names indicate that the original settlers were English-speaking.

P. 172 How are the forests of the Eastern Townships used?

1. (a) Remaining snow patches, leafless trees, and fairly heavy clothing indicate that this is spring.
(b) These are deciduous trees which shed their leaves in winter.
(c) The trees are tapped by inserting a tube through a hole in the trunk and attaching a bucket

to catch the sap. The boys are collecting the sap into a barrel.
(d) The horse is useful because of its manoeuverability among the trees.
2. (a) These are mainly coniferous (evergreen) trees.
(b) The lumber is used for pulpwood.
(c) Hard-packed snow makes a good surface for sleds.
3. (a) Four months have average temperatures below freezing.
(b) The January average is 14°F.
Sherbrooke is colder and has a shorter frost-free season than Montreal.
(c) Summer is hot with moderate precipitation. It is a little cooler in July than Montreal.
(d) In an average season farmers receive adequate rainfall for their crops.

P. 175 Asbestos is used for brake lining, shingles, fireproof curtains.

P. 175 Asbestos — chief mineral wealth of the Eastern Townships

1. (a) Part of Asbestos appears at the top left of the picture.
(b) Open-pit mining is being carried on in the centre of the photograph.
(c) The brake-lining factory uses asbestos from the nearby mine.
2. (a) The serpentine belt extends northeastwards across the Eastern Townships.
(b) Other centres include Black Lake and Thetford Mines.
(c) Copper is also produced in this region.

P. 176 The Chaudière flows northwestward towards the St. Lawrence and joins it opposite Quebec.

P. 176 Why is Sherbrooke the major centre of industry and population in the Eastern Townships?

1. (a) The St. Francis flows northward to the St. Lawrence.
(b) The Magog River meets the St. Francis at Sherbrooke.
(c) 700 feet is the highest contour shown. The main part of Sherbrooke has developed on the west bank of the St. Francis.
2. Electricity is available from the Magog River.
(a) Sherbrooke is a crossroads for routes between Montreal, Quebec, and Boston. Road and rail routes follow the river valleys and meet at Sherbrooke.
(c) Sherbrooke is the only large town in the Eastern Townships. All main roads and railways lead to this city which functions as a regional capital for the area.

Conclusion

1. Resources and industries include rich farmland specializing in dairy production for nearby large cities and maple syrup production; lumbering mainly for pulp and paper; asbestos and copper mines; textile industries; tourist industries. The Townships resemble the Laurentians in that they are a scenic wooded region of fairly low relief providing playground areas for the population of the Lowlands. Lumber, pulp and paper, and hydro-electric industries are common to both. The Townships are generally less rugged, more fertile, and support much more farming and a greater number of towns and mineral developments.
They are much more densely populated. See Tomkins and Hills, *A Regional Geography of North America,* pages 84-93, for a fuller treatment of the Eastern Townships and for a good account of the historical development with emphasis on how the region has been transformed from an English-speaking to a French-speaking one since 1900.

P. 179 Some features of landscape and life in the Gaspé Region

1. (a) The St. Lawrence River is visible.
(b) It is a rocky coast with high cliffs consisting of gently folded sedimentary rocks.
(c) Road building is difficult because of the lack of flat land and the many rugged cliffs and promontories.
(d) This rocky land is difficult for farming and difficult for transportation.
2. (b) The body of water is the Gulf of St. Lawrence.
(c) The Bay of Chaleur is located along the south coast. Percé has attractive coastal scenery.
3. (a) The population is concentrated in centres along the coast.
4. The platforms are for drying fish. This suggests that fishing must be an important industry.
5. Gaspé is 600 miles from Montreal by water, 600-700 miles by road or rail. It is a remote region.
(a) The population is distributed around the coast because greater wealth is available from the sea than from the rugged interior and because transportation is easier along the coast.
(b) The south coast is less rugged and has warmer water than the north side.
(c) The region has developed slowly because it is a remote area of generally rather inhospitable land.

P. 181 Contrasts in the Lake St. John-Saguenay Region

1. (a) Differences include relief, amount of forest, amount of cultivated land, number and pattern of roads, pattern of houses.
(b) Long narrow fields suggest that this is part of Quebec.

P. 182 Quebec's great aluminum industry

This industry may be noted as a good example of Quebec manufacturing: a large-scale enterprise, devoted to the production of one main commodity, requiring huge quantities of locally produced hydro-electric power, and mostly dependent on markets

outside the province. Smelting and the manufacture of pulp and paper are other good examples of such industries.

1. (a) The men are wearing gloves and goggles. Great heat and glare make such clothing necessary.
(b) The ingot is formed by pouring molten metal into a mould. Aluminum is used for airplanes, cooking utensils, boats, and door and window frames. It is very light, hard wearing, and inexpensive.
2. (a) All these products are imported, some from very distant places.
3. (a) Aluminum was needed for airplanes during the war.
(b) Lake St. John, Passes-Dangereuses, and Lac Manouan are used to store water. The Peribonka River carries water from the two latter into Lake St. John. The water reaches sea level at Port Alfred. Snow, melting slowly on higher ground, helps to maintain an even flow of water through the summer.
4. Road and rail transportation is used.
(a) The Saguenay River is in the background. The downstream area is to the right.
(b) The elevated land rises in a steep scarp to a level skyline. This is part of the Canadian Shield.
5. (c) The Vancouver plant does not use Arvida aluminum because it is much easier to import it from Kitimat.
6. (1) Vast quantities of electricity are available because of large numbers of lakes and swiftly flowing streams.
(2) Since vast quantities of power are necessary for such industries as aluminum smelting it is profitable to import raw materials from far distant places and then export the product.

P. 186 The chief pulp and paper centres are Kenogami, Jonquière, and Chicoutimi.
Logs are being transported on sleds pulled by a tractor. This is a form of "cat train."
Snow makes transportation easier in winter. Mud and ruts may impede it at other seasons.
Chibougamau is northwest of the Saguenay Valley.

P. 188 Smelting and pulp and paper industries use large quantities of electricity.

P. 188 Labrador — a land of iron

2. The Hamilton River flows eastward to the Labrador coast.
3. The Labrador Trough extends south from Ungava Bay.
(b) At Steep Rock and Atikokan iron is mined by surface methods. This means that 12,000,000 tons of pure iron can be extracted from the ore in this pit.
4. (a) Crushing and screening ore before shipment reduces the bulk and eliminates the cost of transporting waste material.
(b) The line is about 400 miles long and terminates at Sept Iles.
(c) This is rugged land with few flat areas. Many trestles, bridges, and embankments are necessary.

P. 190 Labrador — a land of harsh winters

1. (a) 7 months are below freezing at Knob Lake.
(c) All food must be imported 400 miles from Sept Iles by rail. It will already have been imported into Sept Iles. Rocky outcrops, poor soil, and forest cover also make farming difficult.
2. Heavy snowfall impedes the operation of surface mine workings. Ungava ores would be carried about 1000 miles by rail to Sept Iles and thence by boat.

P. 191 Problems include harsh climate, inhospitable country, great distances, remoteness.
Occupations will be in mining, hydro-electric projects, and service industries. Lack of soil and short growing season make development of agriculture unlikely.

P. 192 Why is the Mining Belt the chief populated region of the Canadian Shield in Quebec?

1. (a) Wheat is being harvested. The growing season must be 90-110 days.
(b) A tractor and combine are being used.
(c) The land is flat. Cultivated land and a lack of surface water, forest, and rocky outcrops make this land look different from most of the Shield. It is typical of the Clay Belt which extends into Quebec from Northern Ontario. The farming country here is somewhat similar to that near Kapuskasing.
2. Noranda, Malartic, Val d'Or, and Chibougamau are the chief mining centres. Copper, zinc, and silver are also produced.
3. (a) Chibougamau lies northeast of the main centres of the mining belt.
(b) It is connected with the Saguenay Region. The ores are smelted in the Saguenay Valley.

P. 193 Production of mining machinery, construction of roads and railways, smelting, processing, and manufacturing are dependent on the mining industry.

P. 193 Understanding the personality, potentials, and problems of Quebec

1. (1) Lake St. John-Saguenay Region.
(2) Laurentians.
(3) Eastern Townships.
(4) New Quebec.
(5) Mining Belt of Northwestern Quebec.
(6) La Mauricie.
(7) Eastern Townships.
(8) New Quebec.
(9) Mining Belt of Northwestern Quebec.
(10) St. Lawrence Lowlands.
(11) St. Lawrence Lowlands.
(12) La Mauricie
2. (a) The St. Lawrence Lowlands and adjacent areas such as the Saguenay have the worst pollution problems due to waste products from industrial and residential areas.

(b) Pulp and paper mills and sewage disposal contribute most to water pollution.
(c) Purification of water and destruction of fish and game reserves may prove costly in future.
3. Tree planting, control of diseases and erosion are attempting to conserve forests and farmland.
4. (a) Quebec has a long history. Old buildings, the field pattern, and French place names are still prominent in the landscape. New cities, mining and industrial developments are new additions to the landscape.
(b) Vast quantities of cheap power, considerable mineral wealth, forest products, and its location on the St. Lawrence Waterway help make Quebec a great industrial province.
(c) Quebec leads Canada in water power (developed and potential), pulp and paper production, asbestos, aluminum output, textiles, oil refining, hay, and dairy products (butter and fluid milk). For further information, especially that relating to manufacturing, consult the latest *Canada Year Book.*
5. (a) Quebec includes parts of the Great Lakes-St. Lawrence Lowlands, Canadian Shield, and Appalachian Regions.
(b) Canadian Shield (Laurentians, Mining Belt, La Mauricie, Lake St. John-Saguenay Region, Labrador, and New Quebec). Great Lakes-St. Lawrence Lowlands (St. Lawrence Lowlands). Appalachian Region (Eastern Townships, Gaspé).

CHAPTER 5 THE ATLANTIC PROVINCES

Note: See Tomkins and Hills, *A Regional Geography of North America* (or *Canada: A Regional Geography*) for discussion of the physical and historical geography of the Atlantic Provinces.

P. 194 Four Provinces on a busy ocean highway
1. This is an area of restricted channels and rocky coasts; fog and icebergs add to the dangers.
2. (a) Icebergs are carried south on the cold Labrador Current.
(b) Fog is often caused where water of varying temperatures is mixed because of ocean currents.
3. Fish are very important because the land is so inhospitable.
4. This area is on the water route between North America and Western Europe – the busiest ocean highway in the world.

P. 195 Where do the people of the Atlantic Provinces live?
1. (a) Nova Scotia, New Brunswick, Prince Edward Island, and Newfoundland make up the Atlantic Provinces. All these have long shorelines washed by the Atlantic.
(b) Newfoundland has the largest area. Labrador is part of Newfoundland.
(c) P.E.I. is the smallest province.
2. The people are most evenly distributed in P.E.I.
3. (a) The people of Newfoundland and Nova Scotia live along the coasts.
(b) The interior of these provinces is very remote and inhospitable.
4. (a) Northern New Brunswick contains very few people.
(b) Many people live in the St. John Valley. The river valley provides farmland, power, and a routeway.
All these factors attract population.
(c) The rest of the people are concentrated along the coast.
5. (a) Halifax, St. John's, and Saint John appear as circles.
(b) Sydney appears as a cluster of dots.
(c) Charlottetown is the chief city of P.E.I. Fredericton and Moncton are other cities of N.B.
6. Occupations shown include lumbering, mining, farming, shipbuilding, and fishing.

P. 197 What does the land of the Atlantic Provinces look like?
1. (a) P.E.I. consists entirely of lowland.
(b) The land is fairly flat, much is cultivated, and the remainder consists of mixed forest.
(c) It all has a neat, well-cared-for appearance.
(d) Distribution tends to be even in lowland areas.
2. (a) There is little lowland; coast is indented.
(b) The upland is not very high. The surface is very level.
(c) Western Newfoundland is highland.
3. (a) This is a coastal area.
(b) The surface is very level.
(c) High cliffs and rocky coast attract visitors. It is an area unsuited for agriculture and lacking flat land for buildings and communications.
4. (a) Nova Scotia consists mainly of upland.
(b) Few people live in the interior.
(c) The south coast has harbors on the Atlantic fishing grounds.
5. (b) The valley provides a routeway, hydro-electricity, and rich farmland.

(c) Maine borders New Brunswick. It is a remote mountain area.
(d) The St. Lawrence serves as a connection but is frozen for part of the year.
(e) Toronto to Halifax is about 1500 miles.
6. (a) Sable Island – 42°N.
Northern Labrador – 60°N, 1200 miles further north.
(b) St. John's – 50°W.
St. John's to Liverpool is 2300 miles.
St. John's to Fort William is about 2000 miles.
7. 9 a.m. in St. John's
7.30 a.m. in Toronto
6.30 a.m. in Winnipeg
4.30 a.m. in Vancouver

Newfoundland

P. 201 Learning geography from an old sea shanty
1. The storm took place in midwinter.
2. "The glass" means the barometer.
3. The vessel was carrying freight, mail, and passengers to Labrador. Water transport is very important (often the only means of access) in these remote villages.

P. 202 What can we learn from a picture and a large-scale map about the land and people of the Newfoundland coast?
1. (b) The village is built on the cliffs of a cove. The houses are scattered over the cliffs wherever sufficient flat land could be obtained.
(c) The houses are made of wood.
(d) This cove was probably first visited by Portuguese fishermen.
2. (b) The buildings are boathouses and storage houses for gear with drying racks outside.
(c) The platforms are for drying fish.
3. The sea is rich in fish, but the land is rough, rocky, and inhospitable.
4. The coast is rugged and rocky.
5. (a) About four square miles of land are shown on the map.
(b) Almost all the coast consists of cliffs.
(c) The greatest height is 600 feet.
(d) The shoreline at Sculpins Point is very steep because the 600-foot contour ends abruptly at the clifftop and cliff shading indicates a vertical drop to the water.
6. It is 1½ miles from Outer Cove to Sculpins Point. The change in elevation is from sea level to 600 feet.
7. (a) Most of the houses are located at elevations below 100 feet.
(b) The villages are located on coves where fresh-water streams enter the sea and where there is a break in the cliffs with some low, level land near the harbors thus formed.
8. (a) Forest and marsh cover suggest reasons for the lack of farming.
(b) The people are mostly fishermen.
(c) There are poor-quality roads for local transportation, also water transportation.

Note: Pages 203-210 comprise a thorough treatment of the east coast fishing industry within the context of the regional study of Newfoundland.

P. 204 Floats, usually cork, enable the head rope to float.

P. 206 Fishing methods, the "Banks," and ocean currents off Newfoundland
1. Inshore fishing is that carried on near the coast.
2. Groundfish live near the ocean floor; a dory is a small, open vessel. See page 202; trawling is fishing with a long line which has many short lines attached to it; a long-liner is a larger vessel, see page 204.
3. Gill netting is so called because the fish's gills become entangled in the net. A purse seine is different from a gill net because it forms a receptacle for the fish. See page 205.
4. (a) The submerged land is called the Continental Shelf.
(b) The eastern edge of the Grand Bank is about 200 miles from the nearest coast. The Grand Bank is approximately the same size as the island of Newfoundland.
(c) 14 banks lie off the south coast of the Atlantic Provinces.
(d) The maximum depth of the continental shelf is about 100 fathoms, or 600 feet.
(e) Beyond the edge of the shelf the ocean is about 1000 fathoms (6000 feet) deep.
5. The Labrador (cold) and Gulf Stream (warm) currents meet off Newfoundland.

P. 208 21 fish-freezing plants are shown. Dependence on a single product is dangerous because if the supply fails or the market drops the producer then has no other means of livelihood.

P. 209 Services are hard to provide in the outports because the places are small and remote and generally served by water transportation only.

P. 210 Fishing in Newfoundland
1. (a) Fish caught include cod, haddock, lobster, herring, halibut, and salmon.
(b) Cod, herring, and salmon are caught off Labrador.
(c) The fjord is a long, straight inlet with steeply sloping sides.
2. The Labrador Current carries the seals southward. The seal is of value for its oil and for its skin.
3. Modern equipment has enabled fewer men to catch more fish.
4. (a) Newfoundland has the greatest number of people employed in fishing.
(b) It is the leading Atlantic Province in terms of quantity of fish landed.
(c) Newfoundland's catch is composed mainly of the cheaper fish, such as cod and herring, whereas

salmon and halibut make up the bulk of the B.C. catch.

P. 211 Newfoundland is almost entirely surrounded by ice during March.

The climate of Newfoundland

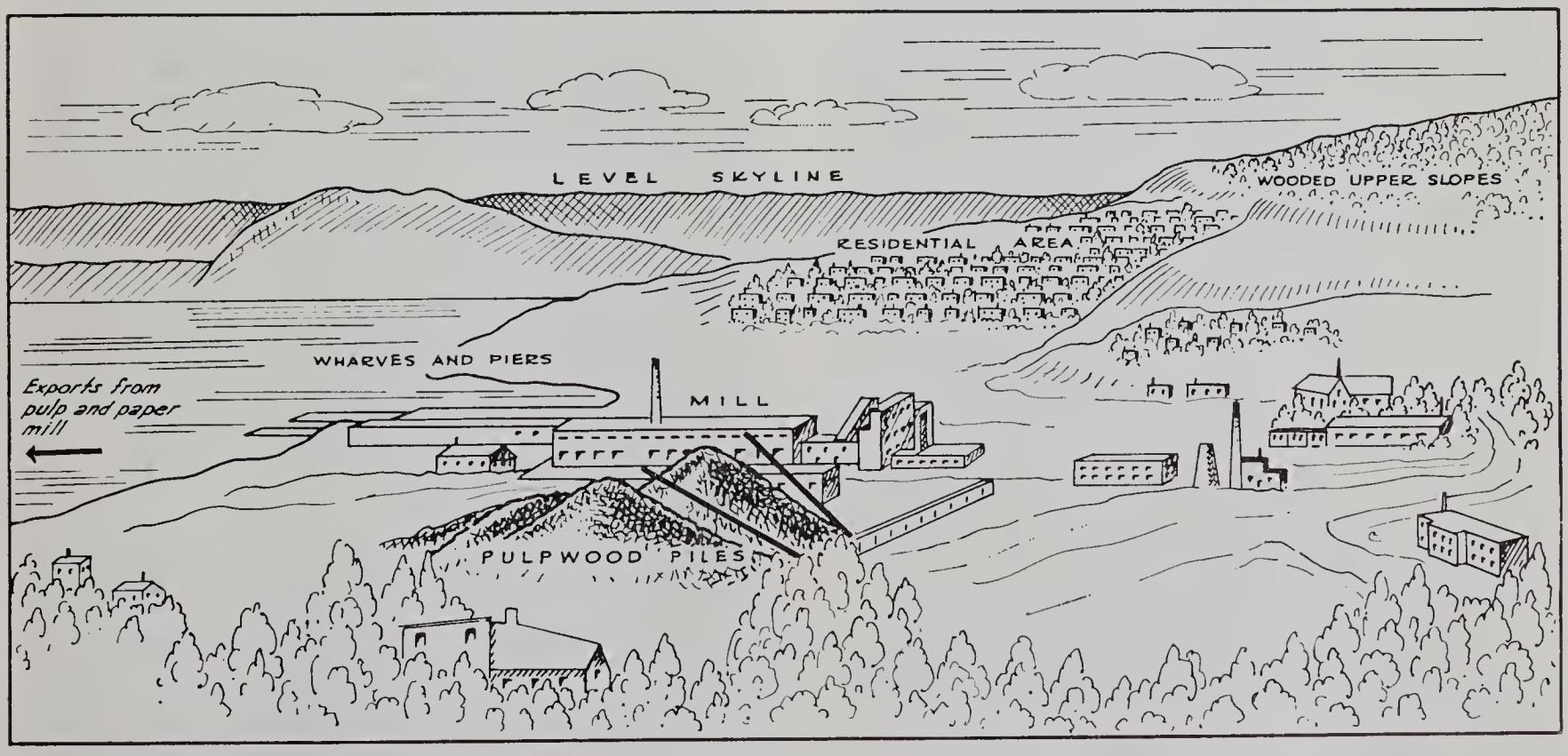
1. The passage refers to the arrival of the fog "half an hour later."
2. It curls and wafts like smoke.
3. The water reflected no color from the sky.
4. Phrases include "drove steadily," "thick airs," "eyes strained into nothing," "air above melted on the sea below."
5. Harvey "went out" in the dory with Tom. He feared collision with icebergs or other vessels, possibly wrecking or running aground if near shore. Radar and radio have made the banks less dangerous in fog.
6. The average January temperature is 20°F. The sea around St. John's is open in January.
The open sea moderates the winter temperatures.
(b) The July average is 60°F. The sea ice keeps spring temperatures lower than they would be otherwise.
(c) Total precipitation for an average year is 53 inches.
7. Belle Isle is colder in winter, cooler in summer, and drier than St. John's. The frost-free season is shorter.

P. 213 The land near Portugal Cove is rugged with thin soil cover. The Avalon Peninsula contains most of Newfoundland's farmland because the bulk of the island's population lives there. The climate there is also relatively moderate. The best soils are found in the thinly-populated southwest corner of Newfoundland.

Corner Brook — a major town of Newfoundland

1. (b) The camera was pointing north.
2. (a) Forested slopes in the distance suggest that the wood was obtained locally.
(b) Streams provide both power and the necessary water used in pulp and paper making.
3. The hills are very flat-topped and rise to an even skyline.
4. (a) Many people in Corner Brook make a living in the pulp and paper industry.
(b) The products can be exported by boat, rail, or road.
5. (a) Hydro-electricity and pulp and paper are also produced at Grand Falls.
(b) The land slopes north and is drained by the Exploits River.

Suggested pupil activity: Make a field sketch of the area shown in Figure 5-18, labelling all significant features clearly.



P. 213 Field sketch of the area shown in Figure 5-18.

P. 215 Iron, lead, copper, zinc, silver are produced. Buchans produces all these except iron.

P. 215 Newfoundland's links with the outside world

1. The railway makes an east-west traverse of the island in a great arc from St. John's to Port Aux Basques. It links all major settlements.
2. Coastal settlements are linked by water transport. Sea ice and fog may cause them to be isolated for long periods.
3. Gander is an important air terminal for trans-Atlantic services.
4. Sydney is N.S.'s main link with Newfoundland.

5. Secondary industries include pulp and paper making, fish processing and canning, and food processing.

P. 215 Why has St. John's become an important city?

1. St. John's has a large, protected harbor.
2. The harbor at A B is half a mile wide.
3. C – South Side Hills.
D – Signal Hill.
E – Downtown St. John's.
The camera was pointing north. Ships sail eastward through the Narrows. North and south of the Narrows there are high cliffs along the coast.
4. St. John's is about 2300 miles from Bristol, 2400 miles from Southampton, and 3000 miles from Hamburg.
5. St. John's is an administrative and educational centre.
6. The town grew up on the west side because the flat land was there.

P. 217 What have we learned about Newfoundland?

1. Gander – air terminal.
Grand Falls – hydro-electricity, pulp and paper.
Buchans – mining.
Corner Brook – hydro-electricity, pulp and paper.
Port Aux Basques – ferry service to mainland.
2. Avalon peninsula – main farming area.
Central plateau – harsh, extreme climate, forested, contains minerals.
Western Highlands – most rugged highlands.
Labrador – part of mainland, fishing, and iron ore.
3. Review the problems of Newfoundland – climate, lack of agricultural land, isolation. Consider advantages to fishing industry – currents, banks, indented coast.

Prince Edward Island

P. 217 What did the Simpson family see in P.E.I.?

1. The ferry crossed Northumberland Strait.
2. (b) People are lightly dressed. This is a large sandy beach with safe bathing. Jim swam in the Gulf of St. Lawrence. The camera was pointing north.
3. There are no hills or mountains in this landscape. The forest has been cleared, homes built, and farmland developed.
4. (a) The land undulates gently rather like the swell on the ocean.
(b) The fields are separated by hedge rows with occasional trees.
(c) Both coniferous and deciduous trees are growing.
(d) There are six or seven farms.
(e) Small, neatly kept fields and a high proportion of cultivated land makes these good names.

P. 219 P.E.I. has a milder climate than most of Newfoundland.

P. 220 How has the land of P.E.I. been used since 1880?

1. In 1881 there was the largest area in farms. In 1951 nearly 80% of the total area was in farms.
2. The size of the average farm increased between 1881 and 1951.
3. The total number of farms decreased.
4. Improved farming methods allow greater production from a smaller area and fewer farmers.
Potatoes and hay are the most valuable crops. Other income is made from the sale of dairy produce, hogs, and poultry, and from other activities such as fishing and tourism.
Herring, lobsters, cod, salmon, and haddock are the chief fish.
People are spread evenly throughout P.E.I. because almost all the land can be used for agriculture.

The site and functions of Charlottetown

1. Charlottetown is the only large town on P.E.I. and it performs all the functions – administrative, educational, distributive, etc.
2. Charlottetown is 40 miles from the Nova Scotia mainland. A causeway would eliminate the need for ferry connections and make possible direct communication by road and rail.
3. The city is laid out on a neat grid system and has many trees. Residential areas are pleasant because they are so close to both the countryside and the ocean.
Food and fish processing, packaging and shipping farm products, servicing and selling farm machinery are likely industries for Charlottetown.
5. P.E.I. is a small province with an agricultural base. It lacks the raw materials, power, and communications necessary to attract industry and a large growth in population.

Nova Scotia

P. 224 An Annapolis Valley farm

1. Orchard crops – 39.9 acres.
Dykeland – 52.9 acres.
Permanent pasture – 53.8 acres.
Hoed crops – 7.7 acres.
Woods – 17.1 acres.
Bush – 2.1 acres.
Cropping – 65.2 acres.
Poultry range – 1.7 acres.
2. Apples are the chief orchard crop. Pears and peaches are also raised.
3. Permanent pasture suggests that livestock is kept.
4. Other income is received by letting of pulpwood acreage.
5. The farm buildings are well located close to the main highway. Kentville is to the west.
6. Dykes testify to the fact that some land is in danger of flooding. This land is close to the Cornwallis River and is protected by the dykes along the river bank.
7. (a) The boys are picking apples. It is fall and the weather is warm and sunny.

(b) The henhouse is about 400 feet from the farmhouse. The presence of two large henhouses plus a brooder house suggest that poultry raising is very important.
(c) This is dykeland. It is very flat and protected from the Cornwallis River by the dyke along its banks. It is used for hay.

P. 227 The climate and agriculture of the Annapolis Valley

1. Climatic hazards include below-zero weather, frosts, hurricanes, summer drought. Frost may damage fruit trees, strong winds and rain may ruin fruit, summer drought may spoil grazing.
2. (a) Four months have temperatures below freezing. Frosts might also be expected in April, October, and November.
(c) Kentville has less rainfall in summer and this combined with high temperatures can cause summer drought.
3. Mr. Newcombe mentions below-zero weather in 1957, early frost in 1959, a wet June in 1961.
4. Unusually early frosts can damage the apple crops, severe winter frost can damage buds, trees, and blossoms.
5. This is a climate with cold winters, warm summers, moderate precipitation with a winter maximum. It is generally favorable to apple growing but frequent variations from the normal can cause great damage to the crop.

P. 228 The Annapolis Valley — summary

1. (a) The land is gently rolling.
(b) Cultivated fields and orchards are evident.
(c) A neat, orderly landscape with a high proportion of improved land indicate that this is a rich and prosperous farming region.
2. Chief forms of land use include orchards, hay, cropland, pasture, woodlots.
3. Problems include variations in climate, flooding, declining demand for apple crop. Weather forecasting, modern equipment, co-operative marketing, and a change to mixed farming are helping overcome these problems.
4. Other sources of income are fishing, gypsum quarrying, tourism.

The Northern Mainland consists mostly of lowlands.

P. 229 Hay is usually the main crop on dykeland. Dairying is the main source of income.

P. 230 Truro is at the crossing point of the main line between Moncton and Halifax and the chief east-west route through Nova Scotia. The Interior Mainland is an upland area.

P. 231 The Atlantic shore is the most densely settled part of Nova Scotia. The chief catches are cod, salmon, haddock, herring, tuna, and lobsters. Only B.C. surpasses N.S. in value of its fishing products. Lunenburg is west of Halifax. Its latitude is approximately 45°N. This coast is rich in sheltered harbors. Yarmouth has cooler summers and milder winters because of its coastal location.

P. 233 The position and functions of Halifax

1. (a) Halifax Harbor — B
Bedford Basin — A
The Narrows connects these bodies of water.
(b) Halifax has many piers and wharves. The map identifies these as ocean terminals and shows a dry dock.
(c) Halifax is not closed by ice in winter.
2. C — North West Arm.
3. (a) This is a peninsula.
(b) The built-up area covers about 5 square miles.
(c) The park is at the south end.
(d) The camera was pointing northwest.
4. (a) D — Citadel.
(b) Halifax Harbor is in Figure 5-40.
5. (a) Dartmouth lies opposite Halifax. It lies east of Halifax. The bridge is ½ mile long. The letter E should have been used to indicate Dartmouth but was inadvertently omitted. It will be included in a future edition.
(b) Oil refineries are visible. Black dots indicate this on the map. The settlement is Imperoyal.
(c) This electricity is made from coal. The plant is located on the waterfront so that coal can be imported by boat.
6. Two major roads and several railways terminate at Halifax. Important railway yards are located at the south end of the harbor. Road and rail routes connect with other parts of the Atlantic Provinces, Quebec, Montreal, and the rest of Canada.
7. (a) Wheat — Western Canada.
Gypsum — Nova Scotia.
Refined petroleum — locally processed from crude oil imported from the United States and Venezuela.
Coal — Cape Breton.
Sugar — Latin America.
Crude petroleum — the United States and Venezuela.
Fish — Atlantic fisheries.
(b) Flour milling, oil refining, sugar refining, and fish canning are likely local industries based on imports.

P. 235 Halifax and the Atlantic shore — a summary

1. Halifax is well situated for trade with the eastern United States, the West Indies, and Europe.
It is a smaller port than Montreal because it is remote from the main centres of Canadian industry and population.
2. The coastal location, the indented coast, and the rich produce of the sea have contributed greatly to the development of this region. The land has poor soils, mediocre forest cover, and few mineral resources.

P. 236 People and the land in Cape Breton Island

1. (a) The water is the Strait of Canso.

(b) The Strait connects the Gulf of St. Lawrence and the Atlantic Ocean.
(c) Road and rail routes use the causeway.
(d) Ships pass through a lift span in the causeway.
2. (a) The piper is wearing Scottish national costume.
(b) This is a land of rugged mountains and wide fertile valleys. This is similar to Scotland.
(c) The western side of Cape Breton consists of highland. The highest elevation is 1747 feet.
3. This lowland is a wide valley. The settlement is on the lowland because this is level land suitable for cultivation and for communications.
The Canso Causeway has made it possible to reach the Island by road or rail without taking a ferry.
4. Most of the people live on the east side of the Island on the lowland area around Sydney.
P. 237 Farming is not important because most of the land is rugged mountains with poor soil.
P. 238 Each man is wearing a metal helmet with a light on the front. These hats provide protection from falling rocks and assist the miner to see in dark corners.

Coal-mining — Nova Scotia's problem industry
1. (a) Coal production has shown a general decline since 1940. These seams are difficult and expensive to mine and cannot compete with other richer coalfields. There has also been a general decline in the demand for coal because of increased use of oil.
2. The seams are reached by a long sloping tunnel.
P. 240 The coal is expensive to mine because of the time spent by miners travelling great distances to the face; special problems of water seepage in undersea mining; seams are thin and fractured.
Halifax gets electricity from thermal plants.
P. 241 Sydney — a major Canadian iron and steel centre
1. Many smoking chimneys and a concentration of buildings, railways, etc. indicate that this is a busy industrial centre.
2. The plant is well located with regard to local coal supply. Waterside location assists in importing Newfoundland iron ore. Road, rail, and water transportation is available.
3. Iron from Wabana, Newfoundland; coal from Cape Breton. Diagonal shading – undersea coal.

See page 241 of text

	Annapolis Valley	Northern Mainland	Interior Mainland	Atlantic Shore	Cape Breton Island
Landscape		Lowland area	Upland	Indented coast	Rugged mountains
Farming		Hay, dairying	Unimportant	Poor soil – local dairying	Restricted to valleys–dairying
Industries:					
Fishing		fish–esp. lobsters	–	various fish	various fish
Forest		–	some sawmilling and pulpwood	–	pit props
Mining		coal	some mining	–	coal
Manufacturing		steelworks, rolling stock	–	oil refining, sugar refining	iron and steel
Others		–	–	shipbuilding	–

New Brunswick
P. 242 The boundaries of New Brunswick
1. Northumberland Strait separates New Brunswick from P.E.I. The Bay of Chaleur separates it from Gaspé.
2. (a) Northwestern New Brunswick is composed of upland.
(b) Rough terrain makes communication with Quebec difficult.
3. (a) Maine borders N.B. on the west.
(b) The St. John River forms part of the border.
4. The Bay of Fundy must be crossed.
5. (a) Northumberland Strait and the Bay of Fundy would be joined.
(b) A canal would give Saint John closer connections with the rest of the Atlantic Provinces and the Atlantic Ocean. Newfoundland, P.E.I., Cape Breton, and the St. Lawrence ports could trade more easily with Saint John.
(c) The canal would also improve water-borne trade between eastern Canada and the eastern United States.
P. 244 Saint John — Canada's second Atlantic port
1. (a) The Bay of Fundy lies outside the harbor. Note that Courtenay Bay (which is really an arm of the Bay of Fundy) is also an acceptable answer to this question.
(b) The harbor entrance is protected by breakwaters.
C – Courtenay Bay
D – Breakwaters
2. (a) B – the harbor.

(b) A – the St. John River.
3. Petroleum, fuel oil, gasoline, and raw sugar come from central America, motor vehicles from the United States and Europe, grain from western Canada, newsprint and lumber from New Brunswick.
(b) Industries including refining of oil and sugar.
(c) Newsprint and flour were probably processed in Saint John.
(d) The harbor is open all winter and receives trade that is unable to use the St. Lawrence.
4. (a) C.P.R. enters the city from the west.
(b) C.N.R. extends to Saint John from Moncton.

P. 245 The Bay of Fundy is about 100 miles long. Herring, sardines, salmon, and lobsters are caught on the Fundy shore.

P. 246 How are the farmlands used?

1. (a) Dairy products are the main source of income.
(b) This is a wide valley with gentle slopes. Most of the land is cultivated. Most buildings are on the valley floor. A large percentage of farmland, neatly maintained, suggests a prosperous farming community. Products can be sold in Saint John.
2. The land is flat. This facilitates the use of large-scale machinery.
3. (a) The men are cutting and baling hay.
(b) The land is used for hay and for pasture.
4. (a) The buildings are probably barns or storehouses for equipment.
(b) This is land subject to flooding.

P. 246 The Cape Breton workings are slope mines beneath the sea.
Hydro-electric production declines in late summer and fall because the flow of water is lowest at this season.

P. 247 The St. John River is visible.
Fredericton is in a fairly central position in New Brunswick at the junction of the four natural regions. The St. John River Valley stands out as a ribbon of settlement.

P. 247 The landscape, land use, and climate of the Upper St. John Valley

1. (a) Hay is indicated in Figure 5-54.
(b) Hay, potatoes, dairy produce are sold.
(c) Covered bridges suggest heavy winter snowfall.
2. (a) The buildings are on elevated land close to the river.
(b) The land is gently rolling.
3. The men are spraying potatoes.
4. (a) The source of the river is in the United States. It is about 1000 feet above sea level. It enters Canada above Edmundston at 500 feet.
(b) Lumber is used for the production of pulp and paper.
(c) Edmundston can obtain power from Grand Falls.
(d) Products must be transported 200 miles to Saint John.
(e) There are 2 developed power sites. Beechwood is 80 miles from Fredericton.
(f) The St. John reaches tidewater at Fredericton, 80 miles above its mouth.
5. (a) The January average at Grand Falls is 10°F. Five months have temperatures below freezing.
(b) Grand Falls receives an average of 150 inches of snow.

P. 251 The highest elevation shown is 2690 feet. Upland is found to the northwest.
The men are sorting logs. Other important pulp and/or paper centres are Campbellton, Dalhousie, Newcastle, Saint John. Forest conservation includes planting, controlled cutting, disease and pest control, fire prevention, research on all these topics. There are few roads and railways in Central New Brunswick. Lumber industry must have communications to move materials.

P. 252 Eastern New Brunswick is mainly lowland. The main catches are herring, lobsters, cod, and salmon. Most of the population is concentrated along the coast.

P. 252 The Atlantic Provinces

1. The first part of the discussion under this heading will require some reference to material studied on pages 242-252. For each of the industries in the list, name the chief regions and cities where the industry is carried on and name the chief products of the industry.
The statement at the bottom of page 252 refers to the three questions posed on page 199. Thus: Why is population concentrated on coasts and river valleys? Review limited resources of interior and advantages of coast. Why do so many people look to the sea for life and trade? See above. What is each region like? What are the problems of each region?

Region	Major characteristics	Problems
Newfoundland	Harsh climate, inhospitable interior, sea-oriented.	Fog. Lack of agricultural land. Over-dependent on fishing. Isolation.
P.E.I.	Agricultural lowland.	Lack of industry.
Nova Scotia	(See transect diagram p. 241)	Remote, limited farmland. Coal industry.
New Brunswick	Agricultural valleys in vast forested upland.	Communications.

2. (a) Soils are poor and the climate harsh.
(b) The climate is very severe, poor soil, thin forest, limited mineral development (iron).
(c) The largest rivers are in Newfoundland and N.B.
(d) Nova Scotia lacks major rivers.
(e) The region is cut off by rough mountain country, and by an indentation of the U.S.A.
(f) Atlantic coal is too far from Southern Ontario.
(g) Expense of mining, competition from other fields and from oil have contributed to the decline of Nova Scotia coal.
(h) Depletion of the forests and the introduction of the steel ship contributed to the decline of lumbering and shipbuilding.
(i) The warm Gulf Stream helps raise the water temperature of the Atlantic coast.
(j) The region is rich in fish but much of the land is inhospitable and unproductive.
3. (a) The St. John River provides water for major hydro-electric developments in New Brunswick.
(b) The coalfield supplies fuel for the thermal plant in New Brunswick.
(c) Sydney produces primary iron and steel.
(d) Many pulp and paper mills indicate the importance of New Brunswick's forests.
(e) The other leading minerals are lead, zinc (Bathurst), and gypsum (Truro).
(f) P.E.I. is lacking in mineral wealth, power resources, and industrial development.

CHAPTER 6 MANITOBA

P. 255 Climate and life in Winnipeg
1. (a) Screens are to keep out flies and insects in summer; double windows are to help provide insulation against the extreme winter cold.
(b) His car must be specially serviced to withstand the severe winter cold.
(c) Heavy coats and hats, furs, and lined overshoes are necessary in winter. Rainproof clothing is not necessary as precipitation is in the form of powdery snow.
(d) Snow and ice may make roads treacherous. Fog from exhaust fumes impedes visibility.
(e) Wind sweeping across the flat surface helps keep roads free from snow. The snow is very fine and powdery: in milder, more humid areas it may be wet and soggy.
(f) Skating, hockey, and curling are popular winter sports. Lack of sloping surfaces makes skiing impossible.
(g) In deep lakes there is always sufficient water below the ice to keep the turbines operating in hydro-electric developments.
(h) A great deal of sunshine makes winter cheerful.
2. (a) April and May are unpleasant because of the constant freezing and thawing.
(b) Winnipeg is very hot and dusty in midsummer.
3. (a) The chart in Figure 6-1 should be studied carefully. Such a diagram is a good way of representing seasonal changes or agricultural practices around the year.
(b) The ground is frozen from early November until mid-March. Thawing begins at the end of March.
(c) 3 months have average temperatures above 60°F.
(d) The frost-free season is 111 days. (St. Catharines has 169 days.) Plants in Winnipeg receive more July sunshine because Winnipeg is further north and has longer days.
(e) Vancouver receives little January sunshine because this is in the wet, winter season and the sky is usually cloudy.
(f) Most of the precipitation occurs in spring when the crops are growing most rapidly.
(g) The total annual precipitation is 20 inches. (Regina 15 inches, Saskatoon 14 inches.) The eastern prairies receive more precipitation than the Saskatchewan prairies. Half the annual precipitation occurs between May and August.
(h) Montreal receives more than twice as much snow as Winnipeg. Less snow in Winnipeg makes snow removal less of a problem.
(i) Grain harvest is under way from mid-August to September.
P. 257 The annual range of temperature is 67°. Few large cities in North America have such a large range.
P. 259 The main flood area was south of Winnipeg. The floodway follows a wide arc east of the city.
P. 260 Further studies of the climate of Manitoba
1. Extremes of climate result in damage from thunderstorms and high winds, flood damage, drought, and general discomfort from extreme heat and severe cold.
2. (a) The average January temperature falls as one goes from south to north. July temperatures also decrease somewhat. The growing season shortens

markedly. Figure 6-7 should be introduced at this point. Every school library should contain a copy of the *Economic Atlas of Manitoba* from which this map is taken. The "Atlas" is obtainable from the Department of Industry and Commerce, Winnipeg, Manitoba. Write to the Information Division for details.
(c) Precipitation is low throughout Manitoba, with a summer maximum.

P. 263 7 vegetation belts are identified. Tundra is found only in Manitoba. More than half of Manitoba is in the forest zone. Churchill is frozen much of the year because it is on an almost landlocked sea and is not warmed by any warm current such as the Gulf Stream which ameliorates conditions at Bergen.
6 soil zones are represented in Manitoba. The forest soils of the north are thin and acidic. The black and brown soils of the south are deep and rich.
Wheat and mixed farming are important in southern Manitoba. Alberta has the largest area of pioneer fringe.

Northern Manitoba	Southern Manitoba
Coniferous forest.	Prairie and parkland.
Thin podzolic soils.	Deep, rich soils.
Little farming.	Wheat and mixed farming.

The land shown is rather flat, thickly forested, with a great deal of surface water and rocky outcrops. Extensive areas of swamp and marshland suggest that the three large lakes were formerly much larger.
Northern Manitoba (defined as the area north of the "well-populated" zone shown in Figure 6-12) contains most of the lakes. Most of the drainage is to the northeast.
A wide coastal area of marsh suggests that Hudson Bay was once larger.
The chief area of lacustrine plains is between Lake Winnipeg and the U.S. border.
Sand, gravel, boulder clay have been deposited by glaciers in Manitoba. Most of these materials are found in the south.

P. 264 The land is divided into square lots.

Land and life on a Manitoba farm

1. (a) The township is six miles square and includes 36 square miles.
(b) 36 sections make up a township. Each section is one square mile in area.
(c) 1¾ square miles were retained by the Hudson's Bay Company.
(d) 16 square miles were set aside for railway grants.
(e) 2 square miles were set aside for school purposes.
(f) Flat land made such a system easy to use.
2. (a) The snow is about one foot deep.
(b) The land is flat.
(c) Trees provide shelter from wind, protection from blowing snow, and summer shade.
3. (b) Caragana, spruce, and other unidentified trees grow around the buildings.
(c) 5 buildings store grain.
(d) Mr. Faurschou owns 1250 acres or nearly two square miles.
4. (a) This is a summer picture. There is no snow; the sun is shining brightly; and awnings have been installed on the windows.
(b) In both cases the sun is shining brightly.
(c) This is a late summer or fall scene. The men are coatless and have hats for protection from the sun.
(d) The home quarter is that part of the farm where the house and buildings are located.

P. 271 A further study of the Faurschou farm

1. (a) Slightly less than half the land was in wheat in 1961.
(b) About one fifth was in fodder crops.
(c) About one eighth was in summer fallow.
2. (a) Mr. Faurschou keeps no stock because his soil is excellent for grain growing and production of grains is more profitable.
(b) Spring — sowing.
— stimulate growth of weeds in summer fallow.
Summer — spraying weeds.
Fall — harvesting.
Winter — cleaning seed grain.
Winter is a busy time on this farm because of the emphasis on seed grain which requires careful cleaning and marketing.
(c) Summer fallow is land kept cultivated but unplanted. Its purpose is to rest the soil and enable it to build up a supply of moisture and nutrients.

Suggested pupil activity: 1. Make a pie graph showing the proportion of the total farm acreage devoted to each crop mentioned.
2. Make a circular diagram showing the seasonal activities of the farmer's year.

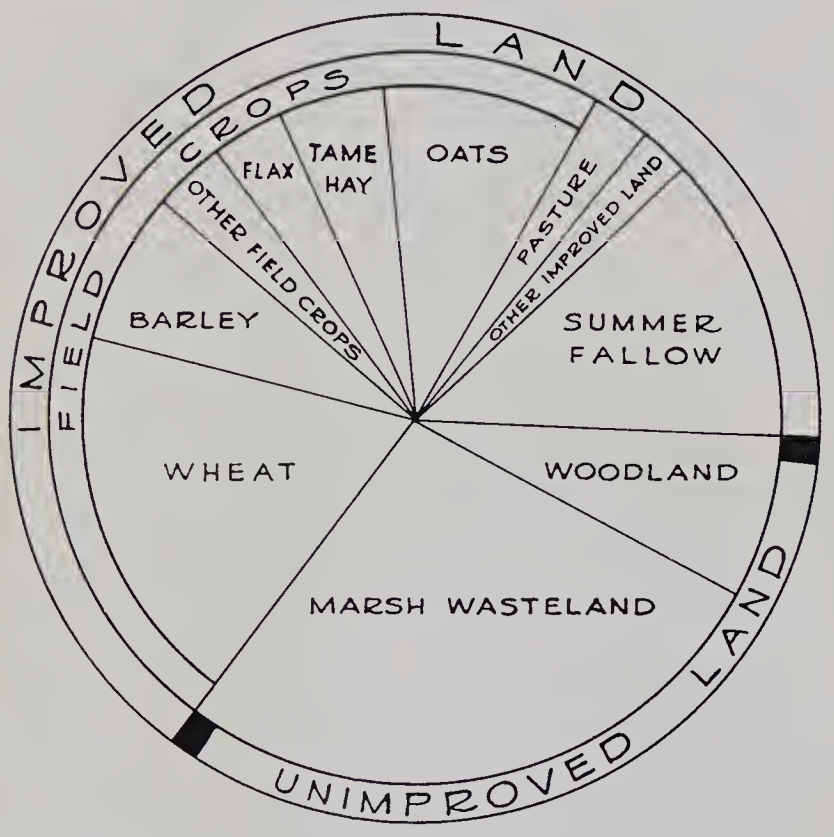
P. 272 Mixed farming helps save farms from disaster, because if one crop fails for some reason the farmer can make his living from another. It is better for the soil because different crops take different nutrients from the soil.

Agriculture in Southern Manitoba

1. (b) There are more trees here. The lady is lightly dressed.
2. (b) 64% of the total land area is improved.
(c) 77% of the unimproved land is marsh and wasteland.
(d) 23% of the unimproved land is woodland. Southern Ontario has a low proportion of woodland.

(e) 66% of the improved land is in field crops.
(f) 5 leading crops by acreages are wheat, oats, barley, flaxseed, mixed grains.
(g) One quarter of the improved land is summer fallow.
(h) Food-processing industries include flour milling, oilseed processing, sugar refining, brewing, cleaning and processing vegetables.
3. (a) Mixed farming occupies most of the land.
(b) The dairying and market gardening areas are close to Winnipeg.
(c) Most of the wheat acreage is located in the south.
(d) The main areas of beef cattle are around the lakes. Many cattle would also be found in the dairying zone.
(e) Mixed farming now occupies a much greater area than wheat farming.

Further pupil activity: Combine the four pie graphs in Figure 6-20 into one diagram showing land use in Manitoba.



P. 273 The land use of Manitoba (surveyed area).

4. (a) The breakup date ranged from April 10th to April 26th.
(b) Frost was the greatest problem in 1955 — late seeding, early freezing.
(c) The range of time was 32 days for seeding, 15 days for harvesting, 25 for freezing.
5. (a) Forested land is visible in the distance.
(b) The picture was taken in fall or late summer. The black fields are fallow.
(c) The land is flat.
(d) The land is almost all cultivated, in field crops or summer fallow.
(e) The large buildings are grain elevators located beside the railway track so that freight cars can be loaded for shipment.

P. 276 Winnipeggers travel to the mountain scenery and the skiing it provides. People are very warmly dressed. Deciduous trees are growing on these slopes.

P. 277 The second prairie level occupies southern Saskatchewan. In Alberta the third prairie level is known as the High Plains. It occupies about half of Alberta. The general elevations are —
1st level — 600-1000 feet
2nd level — 1000-2000 feet
3rd level — 2000-4000 feet

P. 278 Forested, gently rolling land indicates that this is near the northern margin of cultivated land.

P. 279 The waterside location provides transportation for the logs, water for processing and possibly power.

P. 280 Food and beverage, petroleum, paper, printing and publishing, wood products, leather products, fish products are industries based on local raw materials.

P. 281 Winnipeg in photograph and map
Note: This is a further example of an intensive study of an urban area. Every major Canadian city has been presented in some depth. However, teachers should refer to any sources available for further information on each city studied. Most studies are designed to enhance map skills. In this case, questions 4 (h) and (i) in the exercise on page 284 require pupils to consider the possible uses of different maps in the study of a given area.
1. (a) The Red and Assiniboine rivers are shown. Their waters finally reach the sea via Lake Winnipeg and the Hudson Bay drainage system.
(b) The camera was pointing northeast.
(c) The land is flat.
(e) The Parliament Buildings are on the bank of the Assiniboine.
(f) The chief downtown area is on slightly higher land close to the confluence point of the rivers.
2. (b) The Red River appears in the background.
(c) The camera was pointing east.
3. (a) Industries shown include railway maintenance, quarrying (sand), oil storage, and stockyards.
(b) Winnipeg is about 750 feet above sea level.
(c) The road system and city blocks extend back from the river in long parallel strips. These strips change their orientation in accordance with the meanders of the river. They also have an historical origin, having developed out of the "long lot" pattern that early French-speaking settlers brought from Quebec.
(d) St. Boniface lies east of Winnipeg on the opposite bank of the river.
(e) The map supplies names of various features,

gives information on elevations and gives more detail about roads and railways.
(f) Photographs show more of the appearance of buildings, type of vegetation.
4. (a) Many roads and railways radiate from Winnipeg like spokes from a wheel.
(b) No contours appear; the spot heights are all between 772 and 888, roads and railways are straight, marshes and drainage ditches appear.
(c) Winnipeg is the only centre too large to be shown by a conventional symbol.
(d) Many French place names appear: e.g. Beauséjour, Giroux, Ste. Anne. The long-lot field pattern was prominent in the photograph. Most of the French-speaking settlers established themselves east of the Red River.
(e) Large areas of marsh make this land unsuitable for farming.
(g) Selkirk is on the Red River between Winnipeg and Lake Winnipeg.
(h) The street pattern, individual buildings, and many names have been eliminated from this map. A much larger area is shown in Figure 6-34 and provides information about the surrounding areas, and about Winnipeg's position in relation to other places and features.
(i) Large-scale maps provide details and small-scale maps give information about larger areas. They are valuable sources of information on position, transportation, etc. Figure 6-7 gives information about the physical character of the land around Winnipeg. Figure 6-21 tells about the farming of the hinterlands; Figure 6-25 shows the position of Winnipeg on the prairies. Atlas maps give information about Winnipeg's position in Canada and about its location relative to other places in the world.
5. (a) Winnipeg is in a narrow corridor between Lake Winnipeg and the international border.
(b) All transcontinental routes funnel through this point.

P. 288 A study of Churchill and its hinterland

1. (a) Large-scale machinery has been installed so that many vessels may load at the same time.
(b) Ships must travel through the Arctic islands and could not travel the northwest passage to Asia.
(c) Wheat is transported from the prairies by rail.
(d) Churchill is closer to the Prairie wheat areas than Montreal. The shipping season is at least five months longer on the St. Lawrence. The Seaway enables ocean-going vessels to reach the Lakehead for loading wheat.
(e) Vancouver is open for navigation all year.
(f) Prince Rupert is open all year because of a warm ocean current. Location on the west coast gives Prince Rupert a more equable climate than Churchill which is in the heart of the continent.
(g) Small stunted trees, bare outcrops, and a generally bleak aspect suggest this is in the Arctic. The seacoast is low.
2. (a) Rail, air, and water transportation serve Churchill.
(b) This is a very small settlement.
(c) Fort Prince of Wales is on a promontory opposite Churchill.
(d) The elevation rises from sea level to 76.9 feet at the southern edge of the map.
(e) The land is very flat, low lying, marshy, and studded with many small lakes.
3. (a) There is very little agricultural land available and the growing season is very short.
(b) The land is too flat to provide the necessary drop in water level.

P. 290 The land near Thompson is flat and thickly covered with coniferous forest. Further north there would be less forest cover and further south the land would be cultivated. This is an area of ice-scoured lowland, undulating, with bog and rock outcrops.

P. 293 Pipes at Flin Flon are not located underground because the town is built on bare rock. They are insulated with steam pipes close to sewage and water pipes so that everything does not freeze in winter. Bare rock outcrops, poor forest cover suggest that Flin Flon is in the Canadian Shield. Severe climate, lack of agricultural land, remoteness, expense of communications are problems in establishing a town.

P. 294 Summary and conclusions

1. (a) Most of the soils were deposited by glaciers or in preglacial times. See page 276 for discussion of ice action.
(b) The ice sheets denuded northern Manitoba of its soil. The effect further south was of deposition rather than denudation.

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2. **Northern**	**Southern**
(a) Sparsely settled.	(a) Dense rural and urban settlement.
(b) Mining, pulp and paper, hydro-electric stations.	(b) Farming, manufacturing.
(c) Rocky, denuded landscape, innumerable lakes.	(c) Flat plains of deposited material.
(d) Extreme climate.	(d) Extreme climate but longer growing season.
(e) Nickel, cobalt, copper, zinc, pulp and paper.	(e) Wheat, other grains, beef cattle, dairy produce, oil, manufactured goods.

3. (a) Extreme climate is related to the province's position in the heart of a large continental land mass. The moderating influence of the sea is absent. The level plains of Manitoba are open to invasions of cold arctic air in winter and warm tropical air in summer.

(b) Adjustments to extreme cold are much more necessary than to extreme heat. Human beings can survive with a minimum of adjustment to ordinary tropical conditions but must make special efforts to survive throughout the winter in a country as cold as most of Canada is at that season.

CHAPTER 7 SASKATCHEWAN

P. 296 What can statistics teach us about the geography of Saskatchewan?

1. (a) Saskatchewan has more than one third of Canada's occupied farmland.
(b) The average Saskatchewan farm is twice as big as the average size for Canada as a whole.
(c) Saskatchewan produces 63.5% of Canada's wheat.
(d) More people live in rural areas than in towns and cities in Saskatchewan.
(e) There is an average of more than one tractor for every farm in Saskatchewan.
2. Saskatchewan — 925,181 people (1961)
Metropolitan Toronto — 1,824,481 people (1961)
Greater Montreal — 2,109,509 people (1961)
3. (a) Saskatchewan farms must be larger than Ontario farms.
(b) Ontario's smaller area of occupied farmland must be used more intensively to produce a greater total farm income.
4. Saskatchewan is a big province of which about half is occupied by farms, which are large, highly mechanized, and mainly devoted to the growing of grain. It is thinly populated with few large cities.

P. 298 Study of a farm and typical rural settlement on the Regina Plains

1. (a) The total area of the farm is 480 acres. This is three quarters of a section. This is smaller than the average Saskatchewan farm.
(b) Wheat, using 280 acres, is the main crop.
(c) Other crops are barley (40 acres), oats (40 acres), flax (60 acres).
(d) The Faurschou farm grew a greater variety of crops and concentrated on the production of seed grain.
(e) Mr. Day has a barn and silo for his livestock.
(f) He has a large shed for his machinery.
2. (a) Growing season — Regina — 96 days.
Portage Plains — 111 days.
(b) Total precipitation — Regina — 15 inches.
Portage Plains — 21 inches.
Slightly more than half of Regina's precipitation falls during the period May to August inclusive.
(c) The short growing season suggests the presence of a serious frost hazard. The fact that the greater part of the precipitation occurs during the growing season suggests optimum conditions for cultivation in this particular climatic regime. The low annual precipitation suggests that it is unreliable and that drought may frequently be a problem in this region.
4. (a) Pense is 16 miles from Regina.
(b) The land is flat.
(c) The picture was taken in late summer when the ripe grain was light colored.
(d) The large fields are unfenced. These are large farms with great distances between the farm houses.
(e) The dark-colored fields are fallow.
(f) Lack of trees and of surface water suggests that this is a dry region.
(g) There are four tall grain elevators beside the tracks.
(h) The village supplies a railway pick-up point for the grain. Goods such as imported food and manufactured goods can also be unloaded from the train here. The village also has a school, church, and some stores.
(i) Pense is 1891 feet above sea level. Few widely-spaced contours appear on this area.
(j) Pense can be reached from Regina by road or rail. Road travel would be less suitable in spring because of the muddy condition of the dirt road from Route I north to Pense.
5. (a) The truck will take the grain to the elevator beside the railway tracks.
(b) The grain will travel by rail from Pense. It will go to Vancouver if it is destined for Japan.
(c) It is about 500 miles to Calgary and about 1200 miles to Vancouver by rail.
(d) The grain will be stored in an elevator and then loaded into ships.
(e) It is 6000 miles from Vancouver to Yokohama. The total distance from Pense to Yokohama is about 7000 miles.
6. (a) The distance to Churchill is 800 miles.
(b) The distance to Montreal is 1500 miles.
(c) The grain is transferred from rail to water at

the Lakehead ports of Port Arthur and Fort William.
(d) The Seaway has reduced shipping costs because a greater proportion of the journey can be made by water and trans-shipment from canal to ocean vessels at Montreal is no longer necessary.

P. 301 The site and functions of Regina

1. (a) Nine railway lines radiate from Regina. The large area of farmland and the flat nature of the land both help to account for the high railway mileage of Saskatchewan.
(b) A grid-style road pattern suggests that the land is flat.
(c) There is a close network of roads. Nearly all are unsurfaced. The dense road network is necessary to provide access to the farms.
(d) Regina is served by air transport.
(e) The Qu'Appelle follows a very winding course 200 feet below the prairie surface. The banks are steep and the valley floor wide and flat. Deep deposits of unresistant material made entrenchment easy. For irrigation, water must be raised to the prairie level.
(f) There is woodland, a lake, and a settlement called Lumsden Beach.
(g) Nearly all the woodland is in the river valleys.
(h) Many intermittent streams suggest that this is a dry area.
2. (a) Most of the industries are on the north-east side of the city.
(b) The main residential area is on the south and west sides.
(c) Waskana Creek has been used in this parkland.
(d) Industries include oil refining, clay and cement products, a steel mill, and others. The steel mill is north of the city. Pipe is made from the product.
(e) Oil comes by pipeline from Alberta.
(f) Other forms of land use are business areas and the administration area.
3. The camera was pointing northeast.
(b) The oil refineries are visible in the distance.
(c) The main downtown district is on the opposite side of the lake.
(f) The airport would be to the left. It lies west of the Parliament Buildings. (Refer to Figure 7-8.)

P. 305 Functions of Regina include provincial and regional capital; railway centre, collection, and distribution point; industrial city; centre of education and research.
Regina has grown as Saskatchewan has grown. It has developed new industries especially those for processing produce of its hinterland. It is well served by all forms of transportation and has adequate supplies of fuel and power.

P. 307 The picture shows low water with a great deal of sand exposed. This would not have been taken in spring when the water was "high, fast, and wide." Also the grain is light colored in the fields. Sandbars are evident in both description and photograph.

P. 307 Key phrases include — "no end to it . . . only grass that went on and on . . . awfully big . . . a vast, still sea."
Today most of the land is under cultivation and there are frequent small villages and a network of roads and railways.

P. 309 Such wind, rain, and hail flattens crops, and lightning may start fires.

P. 309 What is the climate of west-central Saskatchewan like?

1. The weather is sometimes very windy, very cold (–50°F).
(a) 5 months are below freezing. Winter temperatures are similar to those at Winnipeg.
(b) The annual range of temperature is 66°. This is greater than that at Winnipeg. Summers are hot and dry in both places.
(c) Frost-free season — Saskatoon — 104 days.
Regina — 96 days.
Winnipeg — 111 days.
3. Precipitation — Saskatoon — 14 inches.
Regina — 14 inches.
Winnipeg — 21 inches.
Precipitation decreases westward across the prairies.
(b) The annual snowfall is actually not great (only about one quarter that of Montreal).

P. 311 In such flat land there are few swift streams with suitable dam sites.

P. 312 Saskatoon

1. Most of Saskatoon is on the west bank.
2. The University is located on the east close to the bridge.
3. The river is wide, occupies the whole valley floor, and has steep banks.
4. Railway marshalling yards suggest that this is an important railway centre.
5. The main source of energy is a steam plant.

P. 313 Short grass prairie originally covered this region.

P. 315 The enclosures are called corrals. Barbed wire is also used. Many of the cattle will be taken by truck or rail to such centres as Saskatoon, Calgary, Moose Jaw, etc. There they will be sold by auction, or other means, eventually slaughtered, and marketed within the Prairie Provinces, in eastern Canada, or exported to the United States. This is flat, treeless land.
The snow cover in Figure 7-14 is very thin. This permits outdoor grazing such as would not be possible in heavily snow-covered areas of eastern Canada.

P. 316 The South Saskatchewan River project

1. (a) The South Saskatchewan and North Saskatchewan unite to form the Saskatchewan River. Saskatoon is a large city on the South Saskatchewan. Edmonton is a large city on the North Saskatchewan.

(Prince Albert is an example of a Saskatchewan city on this river.)
The Rockies contain the headwaters.
(b) The Oldman and Bow meet between Lethbridge, Alberta, and Medicine Hat, just east of Taber (see Figure 8-7, page 333).
(c) The North and South Saskatchewan meet east of Prince Albert.
(d) The mouth of the Saskatchewan is in Lake Winnipeg. The water finally reaches the sea via the drainage from Lake Winnipeg to Hudson Bay.
3. (a) The main dam will be located between Outlook and Dunblane.
(b) The Qu'Appelle Dam will be east of the main dam.
(c) The shaded areas represent flooded land and irrigated land.
4. (a) Sandbars are very noticeable.
(c) The streams have eroded the prairie in deep gullies.
(d) The land is flat. Most is used for grain, using dry farming methods.
P. 318 The Mixed Farming Belt corresponds with the park belt and black soil zones.
Prince Albert is on the North Saskatchewan River.

What does the landscape of North-Central Saskatchewan look like?
1. (b) The trees form a windbreak and shelter belt.
(c) The land is flat.
(d) There is a good deal of woodland. Fields are irregular-shaped clearings in the forest.
(e) The rainfall must be greater than that of the Wheat Belt, as indicated by more luxurious tree growth.
2. (a) Rough clearings in the forest and a generally new and immature-looking landscape suggest that this is a pioneer area.
(b) Heavy forest cover makes pioneering more difficult than in the Wheat Belt.
P. 319 The Pioneer Fringe corresponds to the mixed forest and grey wooded soil zones.
P. 320 Cement and clay industries are based on local mineral formations.
Coal is found near Estevan.
Sodium sulphate is found west of Regina.
Iron ore is found near Prince Albert.
P. 324 Oil and natural gas developments
1. (a) Major areas of oil production are around Estevan and around Swift Current.
(b) Natural gas production is concentrated further west, on the Alberta border.
(c) Major centres are Estevan, Weyburn, Swift Current, Kerrobert.
2. The largest refinery area is at Regina.
3. The Inter-Provincial and Trans-Canada Pipelines cross Saskatchewan.
4. (a) Crude oil production has increased by 50 times between 1950 and 1960.
(b) Natural gas production has increased by 35 times in the same period.
5. Thermal electric power plants burning coal, diesel oil, or natural gas are located at Saskatoon, Kerrobert, Swift Current, and several smaller centres.
P. 325 Resources of Shield areas include metallic minerals, lumber and pulpwood, hydro-electricity, and tourist and recreation areas.

P. 325 Land and water in North Saskatchewan
1. (a) This is an area of low relief, about half is water covered, the remainder thickly wooded. There are no signs of settlement.
(b) Coniferous trees cover the area closely.
(c) The mill at Prince Albert is the market for pulpwood.
3. (a) This is winter.
(b) They are using lines to fish through ice holes.
P. 326 Elliot(t) Lake had similar problems.

P. 327 A last look at the land of the big sky
1. Four main characteristics of Saskatchewan include (1) a vast extent of level, fertile land, (2) a sparse, largely rural population, (3) a continental climate dominated by arid and semi-arid conditions and a short growing season, (4) an economy based on primary enterprises, especially agriculture and, more recently, on mineral fuels.
2. Consider trend to mixed farming, reasons why, refer to Day farm. Refer to material in Chapter 2 on wheat trade. Consider its role in historic development, future prospects, Canada's responsibility as food producer, Canada's need to buy other country's products.
Consider growing importance of mineral wealth and new developments. Possible future discoveries especially in Shield area. Past exploration of less common minerals in a poor province.
Consider area and wealth of forest; type of trees and possible uses; current developments; problems of exploration. Consider increasing industrial development in traditionally agricultural province, local bases of industry, power; specify modern developments.
Consider aspects of soil conservation, its problems, past tragedies, possible solutions; irrigation projects; forest conservation; fish and game resources.
Consider resources of North — minerals, forests, power, recreation. Problems of exploration.
3. Review what has been studied of the appearance and nature of the land. Review especially Mrs. Hiemstra's descriptions and study pictures.
4. Consider advantages of Saskatchewan as a producer, economic trends, markets. Review other potential sources of wealth and problems associated with their development.
5. List advantages of southern Saskatchewan — climate, transportation, soil, agriculture, industry — and compare with problems of north.

P. 328 The Third Prairie Level or High Plains occupies most of this province. Its elevation is 3000-4000 feet.

P. 329 Land use in the Dry Belt

1. (a) This is a treeless area with little surface water.

(b) The land presents a generally level skyline but the surface is hilly and the valley entrenched. The stream meanders over a wide valley floor between steep cliffs.

(c) Such a wide, deep valley was probably carved by ice.

(d) Irrigation water would have to be pumped up from the river level.

(e) This is exceptionally large for a dairy herd. The pastures are not of the lush type associated with dairy cattle. There is no evidence of settlement or transportation for the marketing of dairy produce.

2. (a) About 90% of the land is cultivated.

(b) The cultivated land is used for grain. About half of it is in summer fallow.

(c) More land is in summer fallow because this is a much drier area and the land needs to be rested.

(d) The main uncultivated areas are along the river valleys. The slopes are too steep and the floors too restricted in area and possibly liable to spring flooding.

(e) The [redacted] on the railway and provides a pick-up and d[redacted]ge point for the area. The village provides serv[redacted] for the surrounding area such as grain storage, [redacted] school, church, post office, garage, etc. It is similar in functions to Pense, Sask.

3. (a) The land is used for grain and summer fallow.

(b) Pincher Creek has more uncultivated land because it has more rugged land, nearer to the mountains.

(c) These hills lie at the foot of the mountain range. The area undulates unevenly.

(d) Grazing is probably the chief use of the uncultivated land to be seen in the distance.

(e) The photographer was facing west.

(f) The jagged snow-capped peaks of the Rocky Mountains prove that this photograph was not taken in Saskatchewan, Manitoba, or Ontario.

4. (a) The land is flat.

(b) Siphons are being used to distribute the water from the main channel to the furrows.

5. (c) Stock raising is evident. Waste products from the sugar beets are available as feed.

6. (a) The area covered by the map is 5000-6000 square miles.

(b) Existing irrigation ditches run close to railways.

(c) The proposed new areas are further extensions of the existing areas and new developments along other railways.

(d) The Bow and Oldman unite to form the South Saskatchewan. Medicine Hat is located on this river.

P. 335 The Pacific Coast ports are much closer to Alberta wheat farms than are the east coast ports. Sales to China and Japan also stimulate the export trade from these ports. Grain can reach Liverpool via the Panama Canal. Other European markets are also easily reached by this route.

P. 336 The climate of Alberta

1. The Dry Belt has cold winters, hot summers, and low precipitation.

2. (a) The annual precipitation is:
Edmonton — 17.63 inches.
Medicine Hat — 13 inches.
Regina — 14.7 inches.
Saskatoon — 14 inches.
Winnipeg — 21 inches.

(b) Half the precipitation occurs in the height of the growing season.

(c) Precipitation decreases westward across the prairies.

(d) Edmonton receives more precipitation than the central prairies because it is near the mountains.

(e) Edmonton is cooler in summer, therefore evaporation is less. This has the effect of increasing the precipitation of Edmonton relative to that at Regina and Winnipeg.

3. (a) The latitude of Grande Prairie is 55°N. Longer hours of daylight in this northerly location have the effect of lengthening the growing period.

(b) The average January temperature is 5°F. All the Alberta centres are warmer because of the warm chinook wind.

(c) The July average is 60°F.

(d) The annual precipitation is 16.5 inches.

(e) Farming is successful here because it has an adequate frost-free period (104 days) with precipitation evenly distributed throughout the year. It is in the fertile black soil zone.

P. 337 The climate of the Prairies

(a) The coldest isotherm is –25°F. The coldest winters occur in northern Saskatchewan and Manitoba.

(b) The warmest January isotherm is 15°F.

(c) The warmest winters occur in S.W. Alberta.

(d) The coolest summers occur in N.E. Manitoba and the Alberta Rockies where the July averages are 55°F.

(e) The warmest summers occur along the U.S. border.

(f) The cool July isotherm in western Alberta is due to the cooling effect of altitude in the Rockies.
(g) Precipitation decreases from east to west and from south to north.
(h) In the south the frost-free season ranges between 80 and 120 days. The very short season in S.W. Alberta is due to the mountains.
(i) These maps tell us that the Prairie Provinces (1) comprise a region of low annual precipitation, with maxima occurring on the eastern and western margins and the driest areas in the central prairies; (2) have very severe winters everywhere, with the mildest conditions found in Southern Alberta and the coldest temperatures in the northern half of the region; (3) have warm, but short summers in the southern parts of the region; (4) have short growing seasons, with more than 100 frost-free days found only in the southeast and the southwest. In general, the Prairie Provinces seem to have a continental climate, dominated by semi-arid conditions and a short growing season.

P. 338 There are both gentle and steep slopes in the region. The land was partially wooded and there were many elk and buffalo. It was "the most beautiful scenery I had ever beheld." The Peace River District now has large cultivated areas. Mackenzie visited there in spring.

P. 339 About one third of the area is suitable for farmland. Much is low and ill drained, some is stony, and much is heavily wooded.

P. 340 Most of the forested land of Alberta is in the north and west.

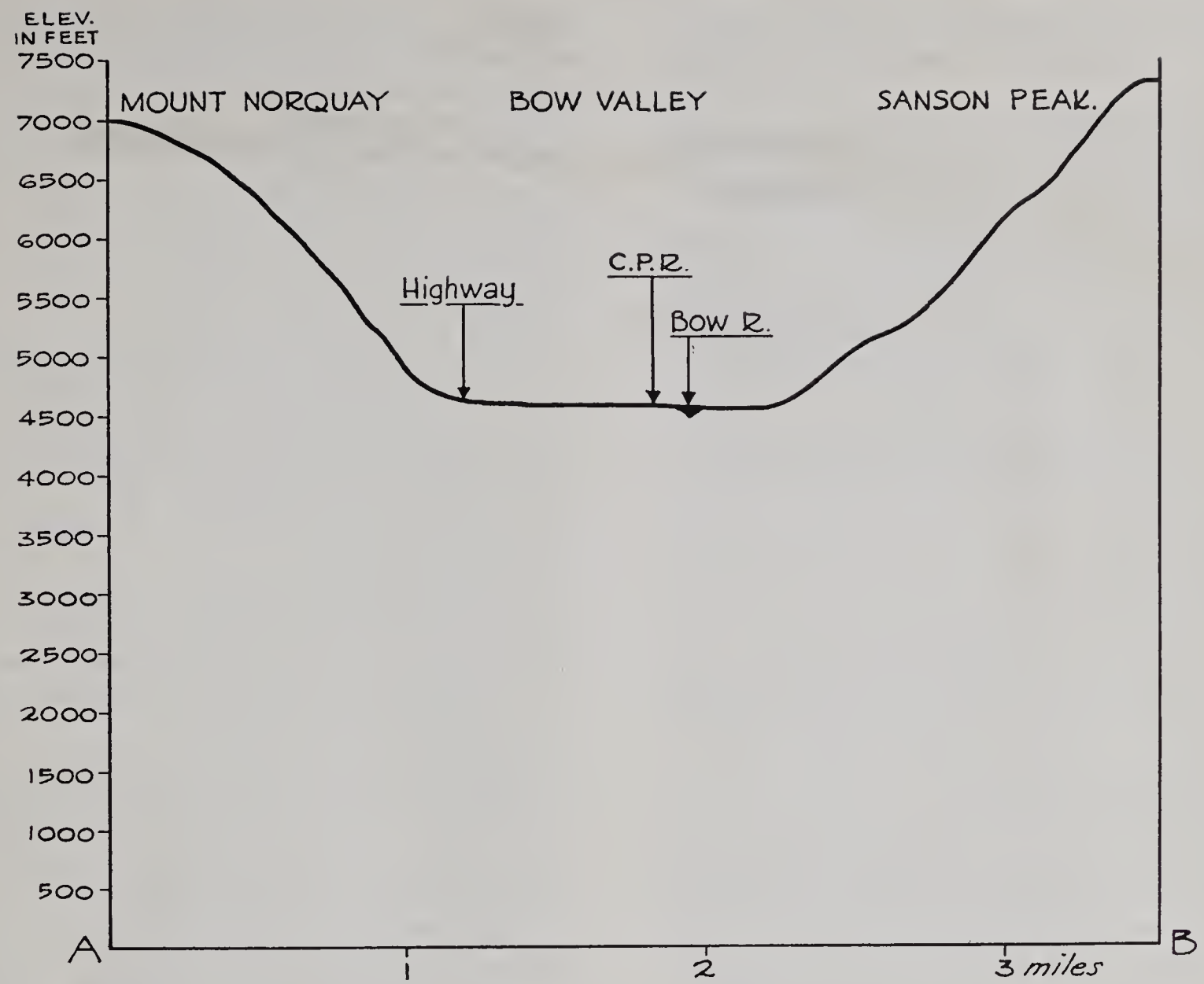
P. 341 The site and functions of Banff as a resort town

1. (a) The photographer was facing southeast.
(b) There is no snow on the mountains.
(c) Banff is on a terrace above the valley floor at the junction of the Bow and its tributary.
(d) Excepting the high peaks the land is heavily forested with coniferous trees.
(e) The climate on the mountain summits is too severe for tree growth.
(f) The valley is a wide, smooth u-shape occupied by a small stream.

P. 341 2. Tunnel Mountain — B
Mount Rundle — C
Bow River — D
Banff Springs Hotel — A
Tributary of the Bow — E

Map Analysis of Figure 8-13 or of the Kamloops extract on page 417, the local topographic sheet or any other the teacher deems suitable is recommended as either an individual or a class project. Supply several sheets of tracing paper: on one trace contours only; on the second trace all surface water; third, land use (forest, orchards, etc.); fourth, all settlement; fifth, communications; sixth, industrial features. In certain cases other categories such as historic features may be added at the teacher's discretion. When all tracings are completed, study the results to see what patterns, e.g. of settlement or communications network, stand out. Then superimpose tracings to study relationships between features, e.g. communications and relief. This is a valuable form of study.

3. (a) We studied the Bow River in the St. Mary Project.
(b) Banff is on the north bank where several other tributary valleys join the main Bow valley. It is about 4500 feet above sea level.
(c) C.P.R. serves Banff.
(d) The Trans-Canada Highway follows the Bow valley at the break of slope where the land rises abruptly to the mountains. Below this point the valley floor is low-lying and marshy, above it the slope becomes too steep.
(e) The Bow is a meandering stream about 200 yards wide. It is swift flowing and forms a waterfall at one point. The valley is about a mile wide except where constricted by Tunnel mountain. It has steep sides and a flat floor containing many pools and marshy areas.
(f) Recreation facilities include mountain scenery, accommodations, road, rail, and air transport, scenic roads and trails, a chair lift, ski and mountaineering facilities, wildlife, golf course, and recreation grounds.
4. (a) The road is about 3 miles long [illegible]nds in a series of hairpin bends in order to [illegible] the steep slope of Mount Norquay.
(b) The elevation is 4600 feet wh[illegible]eets the highway, 5600 feet where it reache[illegible] chair lift.
(c) The contour interval is 100 feet.
(d) The top of the chair lift is 7000 feet above sea level. The total vertical distance travelled is 1400 feet. This is covered in less than a mile.
(e) Banff lies southeast of this point which commands a view across the flat-floored Bow valley to the high peaks on the other side.
(f) See drawing at top of page 41.
5. (a) This is mixed forest.
(b) The slopes are too steep and rocky and the climate too harsh above this line.
(c) This is a summer scene.
(d) Scenic domes have been installed on the train.
6. Glacier — D
Hanging Valley — B
Cirque — A
Moraine-ponded lake — E
Lateral moraine — C
Terminal moraine — F
7. The debris in the foreground has been deposited by the retreating ice.
(b) Temperatures have been generally rising in



Horizontal scale 1 : 50,000
Vertical scale 1/4 inch = 500 feet.

P. 343 Ques[illegible]f) Section of Banff map.
Note: – the h[illegible]itude of this area. What is the elevation of the Bow Valley floor?
– the U-shaped valley. How is this type of valley formed?
– the location of the road and railway in relation to the valley floor.

recent years.
(c) Coniferous trees appear in the foreground. Most of the area is covered by ice or bare rock and cannot support trees.
P. 345 Between 1946 and 1960 Canada's oil needs multiplied three times. In 1946 she met 11% of her needs, in 1960, 70%.
P. 346 In 1946, 65 wells were drilled, 2370 in 1956, 1449 in 1960. More than 15 times as many wells were capable of producing in 1960 as in 1946.
In 1960 Alberta produced 72% of Canada's production. Saskatchewan was the only other important province.
P. 349 The Brazeau area is gently undulating land densely forested with coniferous trees.
P. 350 The Trans-Mountain pipeline supplies the Pacific coast. This supplies oil to northwest Washington.
The Interprovincial line sends branches to Saskatoon, Moose Jaw, and Winnipeg.
Sarnia is its terminus.
Oil from Portland comes from Central America. Foreign oil sources can use cheap water transportation to supply eastern Canada. Refining centres include Montreal, Toronto, Sarnia, Halifax, and Saint John. All the main prairie cities have refineries, also Vancouver.
P. 352 Natural gas is sent to Washington, Montana, the Midwest, and the northeastern states.
P. 353 The largest gas fields are in the eastern part of the province. The Peace River fields are northwest of Grande Prairie.
P. 356 Reviewing Alberta's mineral wealth
1. (a) See p. 347.
(b) Review industrial, domestic, transportation uses. Canada's oil production has increased greatly, a much higher proportion of her requirements is being met but large quantities of oil must still be imported.
(c) Consider expenses of survey and exploration.

Chief reason for expense is large number of wells drilled relative to number of good producing wells found.
2. See pages 350-351.
3. Petrochemicals are those manufactured from oil and natural gas, including nylon, rubber, anti-freeze, ammonia. Other products are gasoline, kerosene, lubricating oil, asphalt.
4. The Athabaska oil sands are deposits containing oil in the form of bitumen. Exploitation has been too expensive to justify their development until now.
5. Conservation includes regulation of production so that the product is not wasted.
6. (a) Coal production has declined as oil has become more important for domestic fuel and for locomotives.
(b) Most Alberta coal is used to produce thermal-electric power.
Lethbridge and Medicine Hat are centres of agricultural areas providing services for the surrounding districts and processing and shipping the produce.
P. 357 Traders reached Fort Edmonton via the North Saskatchewan River.
The site, land use, and functions of Edmonton
1. (a) The river meanders through the city and is deeply entrenched in the surrounding plain. Six bridges have been built across it. The deep entrenchment makes trestles necessary in crossing the valley. Ice can cause jams and floods. Valley bottoms provide parkland.
(b) The main part of the city is on the north bank.
(c) The main downtown area is on the high plain close to the river. Railway transportation is important. Shallows, bars, ice, and the entrenchment of the river have prevented its development for transportation.
(d) The other industrial areas are located on the fringes of the city close to the railways. They cover a larger area than the downtown area. Most modern development has taken place east of the city. They are served by railways. They lie outside the city boundaries. This means that Edmonton must provide services for large numbers of people who live in the city but work outside it, but does not receive taxes from these industrial properties.
(e) Residential areas occupy most of acreage within the city limits. The surrounding countryside is mainly farmland.
2. (a) Edmonton at 53°N is 4° further north than Kapuskasing.
(b) Edmonton is situated where east-west routes cross the North Saskatchewan en route for Yellowhead Pass. It has become the southern terminus of routes to the north, for example, the Alaska Highway. It is in the centre of the rich oilfields.
(c) The Yellowhead Pass is reached from Edmonton. Calgary is much closer to the Rockies and is therefore able to take advantage of the recreational facilities offered, also to receive greater benefit from the chinook.
(d) Edmonton is approximately 700 miles from both Vancouver and Winnipeg.
(e) Edmonton has a large airport. See also Figure 8-36.
(f) Connections with the north are especially important.
3. Industries include oil refining, petrochemicals, servicing and supplying equipment for oilfields, processing agricultural goods, service industries.
P. 361 Ample, cheap land and available water have encouraged this development.
Calgary: Alberta's second crossroads, industrial, and commercial centre
Calgary commands Kicking Horse Pass. Calgary is much nearer the Rockies than Edmonton.
P. 362 The site, land use, and functions of Calgary
1. (a) Calgary is on the Bow River which meanders through the city in a huge arc.
(b) The Elbow and Nose Creek are tributary to the Bow. The former is the source of the water supply.
(c) The Bow is a source of water for both irrigation and power. It never dries up because its source is fed by melting snow in the Rockies.
(d) The business district is on the valley floor near the junction of the Bow and Elbow.
(e) The main industrial area is on the Bow Valley floor.
(f) Most of the residential area is on [illegible]igher land to the north and west.
(g) The airport is north of the cit[illegible]
(h) Most of the parkland is in the [illegible] Valley. Calgary and Edmonton both make use of valley floors for parkland.
(i) There is a university at Calgary (the Calgary section of the University of Alberta).
(j) Railways are confined to the valley floor areas below the bluffs. Most industrial areas are served by railways.
(k) The Bow Valley is wider. The Elbow, as city water supply, has been kept free of pollution from industrial developments.
2. (a) The greatest movement of freight is east-west.
(b) The greatest freight business is with Edmonton, Medicine Hat, and Lethbridge. Grain, fodder, sugar beets, machinery are carried.
(c) Varying width corresponds to varying amounts of traffic.
3. The Rocky Mountains are visible in the distance.
4. Coal, oil, and hydro-electricity are available to Calgary. All these sources of power are also available to Edmonton.
5. Reasons for Calgary's growth include position as route centre, command of Kicking Horse Pass,

development as agricultural centre, and recently as the commercial capital for Alberta's oil industry.

P. 365 The questions posed on page 328 can now be answered as follows:

1. Phenomenal growth of oil industry is the main reason for rapid growth of Alberta's population. Also development of irrigation projects, improvements in agriculture, developing of pioneer areas.
2. Oil is attracting most people. Pioneer farming brings in a steady flow. Development of new irrigated areas will attract more.
3. Landscape includes prairie, parkland, forest, near-desert, and rugged mountain scenery.

Only small proportion of these provinces is in prairie vegetation belt. Prairie itself includes different agricultural and industrial developments.

Pp. 365-6 The term "prairie" is not a good one to apply to these provinces for several reasons. All have extensive areas of Shield in the north. Most of these areas are heavily forested. In Chapter 7, we learned that much less than half of Manitoba consists of true prairie. The southern half of these provinces does comprise an agricultural region to which the term "prairie" is often applied. Grain, for example, is grown extensively throughout the southern half of each province. Yet the rich mixed farming belt south of Winnipeg and the irrigation agriculture east of Lethbridge indicate striking contrasts even in respect to farming. Ranges of hills in western Manitoba, the Cypress Hills of Saskatchewan, and the "badlands" of south-central Alberta all belie the notion of uniform terrain throughout the prairies. Nevertheless, since they do possess more level land and more occupied farmland than any other region of Canada, because they have several features of soil and vegetation patterns in common and, above all, because they experience a fairly uniform climatic regime, there remains some justification for treating the prairies as a unit.

Regionalism (i.e. the emergence of distinctive and contrasting regions) is an important trend. Already one can distinguish a region in Southern Manitoba centred by Greater Winnipeg. The region dominated by Regina and Moose Jaw is another example. Saskatoon provides a focal point in west-central Saskatchewan. Another distinctive district lies between Lethbridge and Medicine Hat. The emergence of regions around Calgary and Edmonton comprising physical, agricultural, industrial, and urban elements is brought out in the discussion on pages 356 to 365. Through class discussion, other regions may be identified, e.g. those around Brandon, Prince Albert, or Swift Current. For each region named here, it may be interesting to list the particular features that contribute to its "personality."

All the prairie provinces have extensive areas of Shield in the north. All have important agricultural areas. The vegetation, soil, and agricultural belts extend across the three provinces. All experience similar type of climate.

Mechanization has made it possible to increase production using fewer personnel.

P. 368 Manitoba has the smallest area of road and rail network. This is because so much of the southern half is covered by lakes. Road and rail mileage is very extensive in southern Saskatchewan but ceases abruptly in the latitude of Prince Albert. Road and rail mileage is concentrated in the southern half because the north is an unpopulated wilderness area.

Edmonton, Saskatoon, Regina, and Winnipeg are the main air centres.

P. 368

Alberta

1. Has the only high mountains, the basis of a major tourist industry.
2. Most important for ranching.
3. Has greatest irrigated area.
4. Produces most of Canada's oil and natural gas.
5. Contains two of Canada's fastest-growing cities.
6. Contains the largest northerly agricultural region in Canada (the Peace River country).
7. Has largest population of any prairie province (also was the fastest-growing Canadian province, 1956-61).

Saskatchewan

1. Heart of Wheat Belt — produces nearly two-thirds of Canada's wheat.
2. Produces important mineral fuels and non-metallic minerals.
3. Has more farms than any of the Prairie Provinces.
4. Most rural province of western Canada.
5. Largest extent of level land of any Canadian province.
6. Has greatest road and rail mileages of any western province.
7. Has a rich, largely undeveloped northland.

Manitoba

1. Greatest number of lakes.
2. Greatest flood problems.
3. Has only seaport of prairies.
4. Has greatest development of Shield mineral wealth.
5. Contains largest city of the Prairie Provinces.
6. Has the best developed forest industries of any prairie province.
7. Leads the Prairie Provinces in value, volume, and variety of manufactured products.
8. Has the smallest proportion of its area as true prairie.
9. Has the smallest population of any prairie province.

CHAPTER 9 BRITISH COLUMBIA

Note: The *Atlas of British Columbia Resources* should be in every school library. For information write to the Department of Lands and Forests, Victoria, B.C.

Introduction

Pp. 370-2 Fishing: fjord coast with sheltered harbors.
Logging: large, fast-growing trees of good quality timber.
Grain farming: large level area of good soil.
Ranching: mild climate and abundant pasture.
Tourism: glaciated mountain scenery.
City industries and services: see study of Vancouver, page 381 ff.
Contrasts of relief, climate, vegetation, coastal and interior, city and rural areas.

P. 372 Most of the people live in the S.W. corner of the province. In the interior population is concentrated in valleys. Towns and cities are located mainly on rivers in white areas shown in Figure 9-2. Vancouver and Victoria are located in the southwest. Most of the coast is very rocky and indented. Most of British Columbia is very mountainous. Great distances, rugged mountains, many lakes and rivers, thick forests make communication difficult. Most of the population is concentrated in the Lower Mainland.
The Fraser River has built the delta.
Vancouver lies near its mouth.
The Coast Mountains region is very thinly populated.

P. 373 Victoria is the capital city of B.C.
The Queen Charlotte Islands lie northwest of Vancouver Island.
They are about 50 miles from the mainland.
They lie between latitudes 52°N and 54°N.

The Lower Mainland

P. 374 Introducing the Swenson Farm

1. (a) Ladner lies south of Vancouver.
(b) It is south of the main channel of the Fraser.
2. (a) Canoe Pass is about a ½-mile wide.
(b) The farm is about 5 feet above sea level.
(c) The land is flat.
(d) Dikes (dykes) have been constructed to help control flooding and ditches help drain the land.
3. (a) Large sand and silt deposits have been carried to the sea by the Fraser and deposited offshore as current slackers.

P. 375 What conclusions can be drawn about farming in the Lower Mainland?

1. Flooding is a major problem. This area has problems similar to Holland Marsh.
2. (a) The main sources of income are dairy produce, peas, sugar beets for seed, and potatoes.
(b) Dairy cattle feeding on flat land with high mountains close by are seen in Fig. 9-5.
(d) Almost all the flat land is under field crops or orchards. The land near the river is low-lying and flat. Flooding is a problem here as at Ladner. (Dikes and ditches are also used in this area.)
3. Mr. Swenson uses sprinklers for irrigation.
(a) The total precipitation at Ladner is 36.2 inches. About 10 inches fall in the summer months. Drought is likely in July and August — months which average about one inch total precipitation each.
(c) Most of the precipitation at Ladner occurs in winter.
(d) The temperature seldom falls below freezing. The annual range of temperature at Ladner is 34°, at Yarmouth 47°. Winnipeg is colder in winter than Ladner but registers a similar summer average.
(e) The Lower Mainland has warm summers, mild winters, moderate to heavy precipitation with a marked winter maximum.

P. 377 This is also a problem in the Niagara Fruit Belt.

P. 378 Two pictures and a map show Vancouver's growth in less than a century.

1. (a) The pictures were taken 77 years apart.
(c) The tiny settlement was in a sheltered location on the tidewater of Burrard Inlet.
(d) Forest is visible in the background.
(e) The forest has been cleared and buildings and harbor installations erected.
2. (b) The total population of the municipality of Mission is 9000 people.
(c) There seem to be about 25 municipalities in the Lower Mainland. Not all are incorporated and for this reason it is not always possible to agree on the number.
(d) Nearly all the population is concentrated in the areas below 1500 feet.

P. 379 New Westminster is on the north bank at the mouth of the main arm of the Fraser.

P. 381 1. The large buildings include department stores, hotels, office buildings, commercial properties.
2. (a) Brockton Point — D
Stanley Park — C
Burrard Inlet — A
First Narrows Bridge — B
North Vancouver — F
West Vancouver — G
Coast Mountains — E
(b) The camera was pointing north.
(c) Increasing elevation and steepness of slopes may restrict the growth of North Vancouver and West Vancouver.
(d) The Lions are about 12 miles from Brockton Point. They reach about 5000 feet.

3. (a) Dense forest in Stanley Park suggests abundant rainfall.
(b) Seymour Falls receives the most precipitation.
(c) The airport receives 42 inches. It lies south of the city.
(d) Capilano Lake is artificially formed by a dam. The north shore has heavy precipitation and suitable storage basins.
(e) 50 inches precipitation is recorded at the City Hall.
(f) The total winter sunshine is less than that for July. In winter the sky is frequently overcast because of storms.
(g) Vancouver – 37.6°F.
Ladner – 35°F.
The mild winter enables the harbor to be open for shipping at all seasons.
Mount Seymour is ten miles from Vancouver.
(h) Summers are warm with light rainfall.

P. 384 4. (a) The camera was pointing east.
(b) Between First and Second Narrows is a distance of 5 miles.
(d) Vancouver's street pattern is laid out on a grid system.
5. (d) The northern terminus of the P.G.E. is Fort St. John.
(e) The Trans-Canada Highway enters Vancouver from the south.
6. There is a powerhouse on Indian Arm.
Heavy precipitation, a steady supply controlled by glaciers, and mountain terrain make conditions favorable for H.E.P. development.

P. 385 11 countries of origin are represented.
Coal, lumber, grain, and pulp were being loaded.
Vancouver trades with Europe, Asia, Australia, and South America.
Cargoes were going to China, India, Japan, Australia, the United Kingdom, and countries in South America and Europe.
Lumber is the largest export of New Westminster.

P. 386 Petroleum products, gasoline, flaxseed, flour, barley, and grain probably come from the Prairies.
Pulpwood, chips, lumber originate from coastal points.
Sugar originates from overseas ports.
Vancouver industries include sugar refining, flour milling, secondary metallurgical industries.
Processing local produce includes dairy products, bakery products, dressing poultry, preparing and packaging various foods.
B.C. is world famous for canned salmon.

P. 388 Recreational facilities include beaches, yacht basins, golf courses, parks, zoo, provincial parks with picnic, camping, and skiing facilities, fishing streams, hiking trails, boat cruises.

Reviewing Metropolitan Vancouver

1. (a) U.B.C. lies on a promontory to the west of the city.
(b) Burnaby lies east of Vancouver.
(c) New Westminster is a port, fishing centre, and saw-milling centre.
(d) North Vancouver's industries are concentrated along the north shore of Burrard Inlet.
2. (a) The Fraser is a wide stream flowing through flat, low-lying land. It divides into two arms at New Westminster.
(b) There are: no contours,
extensive areas of bog,
drainage ditches,
many straight roads.
There are many villages on the delta but none in the mountains north of North Vancouver.
(c) The Coast Mountains are high; deeply dissected by many streams; slopes are very steep; they are thickly forested; there is little evidence of man's penetrations.
(d) Excellent harbors, good communications, flat land for building, farmlands, forest, mountain scenery are revealed in this map.
3. (a) Vancouver has a large sheltered harbor open all year. It has good communications with a rich hinterland.
(b) Vancouver is an industrial, commercial, transportation, educational, and tourist centre.
4. (a) The Lower Mainland is a flat, agricultural, densely populated area closely hemmed in by mountains.
(c) There is a shortage of agricultural land in B.C. and the urban centres in the Lower Mainland are competing for this farmland.

The Coast Mountains

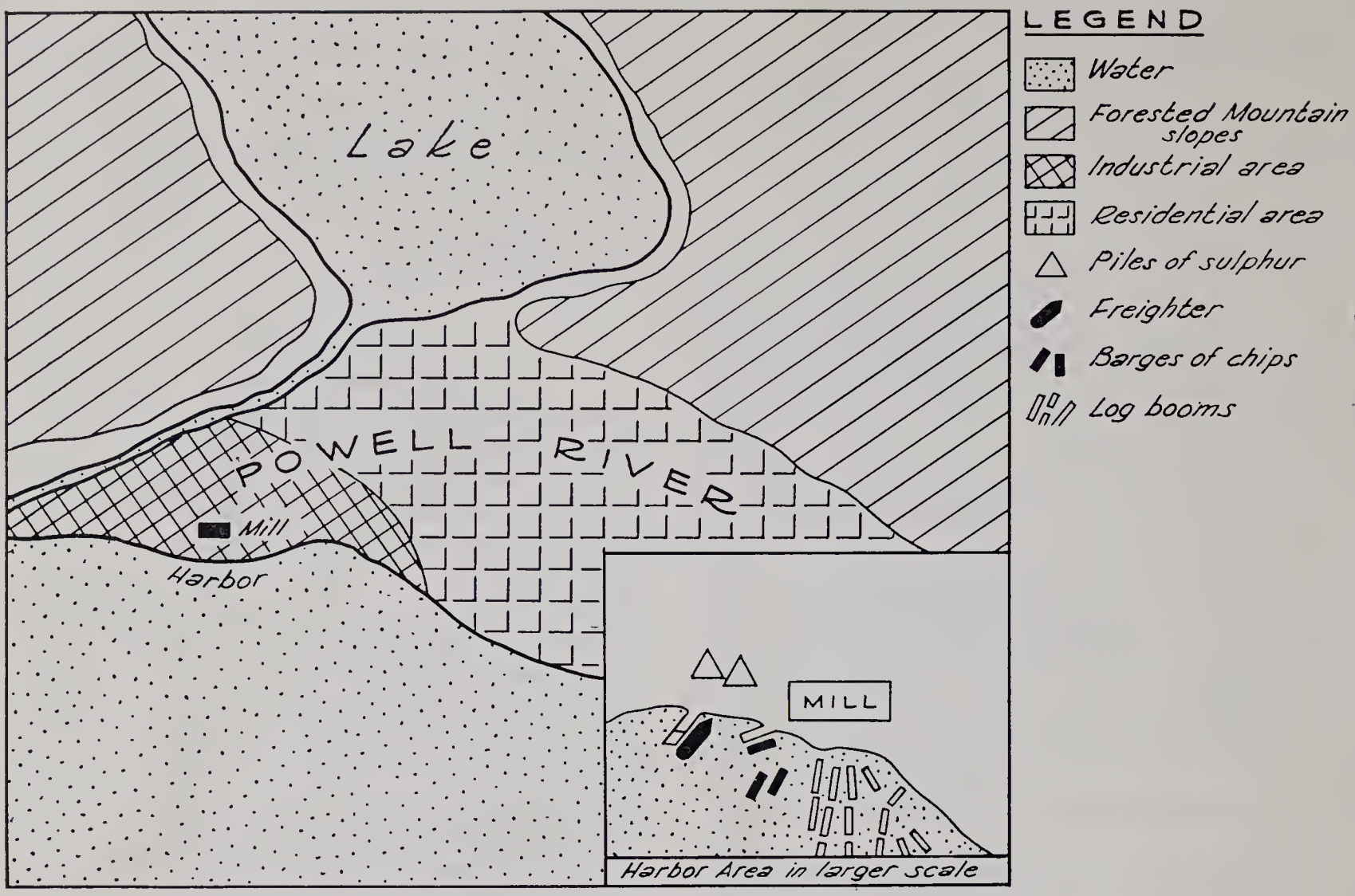
The road from Vancouver to Prince Rupert follows an inland arc of more than 800 miles.
There is little flat land available for agriculture.
Thick forest is also a handicap. Lack of flat land has also made establishing a settlement difficult.
Similarities – very rocky coast, indented harbors, limited flat land, little agriculture, both fishing centres.

Differences:

At Ocean Falls	At Portugal Cove
Thick forest.	No trees.
Modern settlement.	Ancient village.
Large paper mill.	Fishing only.
Mild, wet climate.	More extreme, drier.

Different types of fishing and fish processing.

Hydro-electric power is plentiful because this is an area of heavy precipitation on steep mountain slopes.
Powell River – Log booms – C
Fjord – A
Pulp and paper mill – B
Piles of sulphur – D



P. 389 Sketchmap of area shown in Figure 9-19.

Suggested pupil exercise: Make a simple sketchmap of the area shown in the photograph. Identify clearly the mill, residential areas, coast mountains, harbor.

P. 390 Prince Rupert — the C.N.R. terminates here.
P. 391 (a) The settlement is long and narrow.
(b) The railways follow the coast. Steep grades and thick forests were problems to the engineers.
(c) Prince Rupert has a grain elevator. Wheat arrives by rail from Alberta.
(d) All the land is forest covered.
(e) The island consists of a mountain with two summits of about 2000 feet. The city is located on sheltered water where the land is fairly level.
2. (a) The January average of 35°F is approximately the same as that for Ladner.
(b) Temperatures drop because this is mountainous country and is cut off from the moderating influence of the sea.
(c) Prince Rupert Harbor need not close in winter.
(d) Prince Rupert is a little cooler in summer than Vancouver and precipitation is heavier.
(e) 94 inches is total annual precipitation. This is much heavier than on the south coast. Prince Rupert in October, November, and December receives 36 inches — as much as Ladner receives in a year. Precipitation is heaviest in winter.
Pages 392-395 include a detailed discussion of the Pacific Coast fishing industry. Contrasts might be made with the east coast fisheries discussed on pages 203-211.
P. 395 Herring, cod, and sole are also caught.
P. 396 Ore is transported to Kitimat via the Panama Canal.
Abundance of cheap power was the major factor in selecting this as the site for an aluminum development.
Abundant cheap power, plenty of water, local lumber, and a waterside location for export of product make this a suitable site for a pulp and paper mill.
An apparently limitless expanse of white capped crests make this mountain area resemble the ocean.
Glacial features include glaciers, crevasses, cirques, arêtes, pyramidal peaks, u-shaped valleys, screes, and moraines.
P. 397 Lack of flat land is the main reason for the lack of agriculture in the Coast Mountains.

Reviewing the Coast Mountains
1. Rugged mountains with a fjorded coast, thick forest, extensive remote and unsettled areas make this a distinct region.

A comparison with the Lower Mainland

Coast Mountains	Lower Mainland
High rugged mountains with indented coast.	Flat, low land of deltaic deposits.
Thickly forested.	Cleared for farmland.
Sparse settlement — mainly coastal.	Dense rural settlement with large urban centres.
Fishing, lumbering, pulp and paper, aluminum smelting.	Agriculture, wide variety of industry, fishing.
Few roads and railways.	Dense communication network.

2. The Coast Mountains region provides raw materials — lumber, building materials, power for Vancouver. It also acts as a recreation area.

P. 397 Vancouver Island

P. 398 What factors make Victoria the chief city of Vancouver Island and the second largest city of B.C.?

1. (a) Victoria lies southwest of Vancouver.
(b) From Vancouver one may reach Victoria by:
— Ferry from Vancouver to Nanaimo, road or rail from Nanaimo to Victoria.
— Road to Horseshoe Bay, ferry to Nanaimo, road or rail to Victoria.
— Road to Tsawwassen, ferry to Schwartz Bay, road to Victoria.
The shortest distance is about 60 miles.
Victoria also has ferry connections with Port Angeles, Seattle, and Anacortes.
2. (a) The camera was pointing north.
(b) Parliament Buildings — B
Upper Harbor — C
Oil storage tanks —A
(c) Industries include shipbuilding and repairing, oil storage, sawmilling. Other functions are administrative and educational centre, regional capital, special naval services.
3. This area has an earlier spring than many parts of Canada.
(a) Victoria is a little milder in winter and cooler in summer than Ladner.
(b) The frost-free season is 282 days. The long frost-free season enables farmers to have flowers and vegetables ready for sale before they can be produced in other areas.
(c) The total annual precipitation is 26 inches. This is much less than Vancouver (50 inches) or Prince Rupert (94 inches). Irrigation is necessary because there is so little precipitation in summer.
(d) There are 2093 bright sunshine hours.
(e) Victoria is cool, dry, and sunny in summer. Mild winters and cool summers attract people retiring, who come from the harsh conditions on the Prairies.
(f) Citizens in Victoria require less heating, heavy clothing, insulation, snow removal than those in Edmonton. Air conditioning is not necessary in summer.

P. 400 Esquimalt is an important naval centre. Pages 401-407 include a discussion of the great British Columbia forest industries.

P. 401 Nanaimo is about 40 miles from Vancouver.

P. 402 The forest is thick and consists mainly of very large, tall conifers. The tree has a diameter of about ten feet.

P. 406 Pulp and paper mills are located at Campbell River and Victoria.

P. 407 Chief centres of production on the coastal mainland are Vancouver and New Westminister, Powell River, Ocean Falls, and Port Edward. The coast forests contain very large trees of excellent quality timber. A deeply indented coast makes transportation by water easy. Other workers whose living depends indirectly on forests are those in industries using lumber and paper, manufacturing logging equipment, and those in service occupations.

P. 408 This is an area of rugged snow-capped mountains and many lakes. It is heavily forested and shows no sign of human exploitation. It resembles the Coast Mountains and the west side of Vancouver Island.

P. 408 Reviewing the geography of Vancouver Island

1. The west side has —
rugged mountains with a deeply indented coast,
very heavy precipitation, mild winters, cool summers,
very heavy forest cover,
lumbering and fishing industries,
sparse settlement.
The east side has —
gently rolling land,
light precipitation, mild winters, cool summers, long growing season,
extensive farmland,
fairly dense rural settlement and communication system,
includes Victoria.
Most people are concentrated on the east side.
The long growing season and early spring enables this region to specialize in early vegetables and flowers for shipment to other parts of Canada.
2. Heavy rainfall and mild temperatures have contributed to the growth of the greatest forests in Canada.

3. These very large trees require special equipment and methods of handling.
There is no snow cover on which to transport the timber in winter.
Logging operations take place throughout the year.
Large rivers for transporting logs are lacking, trucks must be used to carry logs to the mills.
Constructional timber is more important in western Canada than it is in the east. (Pulp and paper important in both areas.)
4. *patch logging* — clearing patches in the forest so that they will reseed naturally. The patches also function as fire breaks.
spar tree — one used to attach cables by which logs are hauled to truck.
boom scooter — small boat for sorting logs in pools.
tree farm — an area of forest in which a sustained yield of trees is regarded as the crop.
sustained yield — harvesting and reseeding so that a supply of timber will always be available.
5. Forest enemies include — diseases, insects, deer, weeds, and fire.
Conservation methods include — patch logging, reseeding, fertilizing, thinning, spraying, and fire control.
6. Half the province's output is produced in the interior. Over-cutting in the coastal areas has reduced their proportion of the output.

P. 409 The coast mountains form the boundary on the west. The eastern and western edges are the most rugged.

The Southern Interior

The Middle Fraser Country

1. (b) The canyon wall is steep, almost vertical, and bare of vegetation.
(c) The picture shows a generally arid landscape; but some trees can grow in favored locations.

P. 410 2. (a) The water is very swift flowing and turbulent.
(b) The structure is a fishway built to assist the salmon in their passage upstream.
(c) The canyon wall is steep, rocky, and has little vegetation. This is the west bank.
(d) The slopes are too steep and the rainfall too low to permit vegetation to grow.
(e) The road is narrow, has a steep unfenced drop on one side and the steep cliffs impede vision.
3. (a) Significant phrases are — "loose stones in the face of a steep hill . . . two precipices . . . perfectly perpendicular . . . hills and rocks . . . hanging rocks and projecting cliffs at the edge of the bank made the passage so small . . . to ascend precipices by means of ladders."
(b) The last half of the account describes travel before roads existed.
4. (b) The Fraser at Hell's Gate was 160 feet wide.
(c) It rises 100 feet in summer.
(d) The Thompson joins the Fraser at Lytton. The Fraser is sandy-colored because of the large quantity of sand and silt it carries.
(e) The material carried down the Fraser Canyon is deposited offshore. (See Canoe Pass map, page 374.)

P. 412 Douglas Lake

1. (a) The men are rounding up cattle.
(b) The land is composed of low, rolling hills.
(c) There is extensive land, gentle slopes, grass, and light woodland.
(d) Most forested land is on hill tops.
2. (a) 40 buildings compose the ranchstead.
(b) There are many bunkhouses for the permanent workers.
(c) Chickens, eggs, milk, butter, cheese, pork, bacon, ham, lard are available as local food supply.
(d) Barns suggest that winter feed must be supplied for the animals.
(e) There are 4 barns. The cattle spend the winter out on the range. Hay is distributed to them when necessary.

P. 414 154 acres were irrigated in 1961.

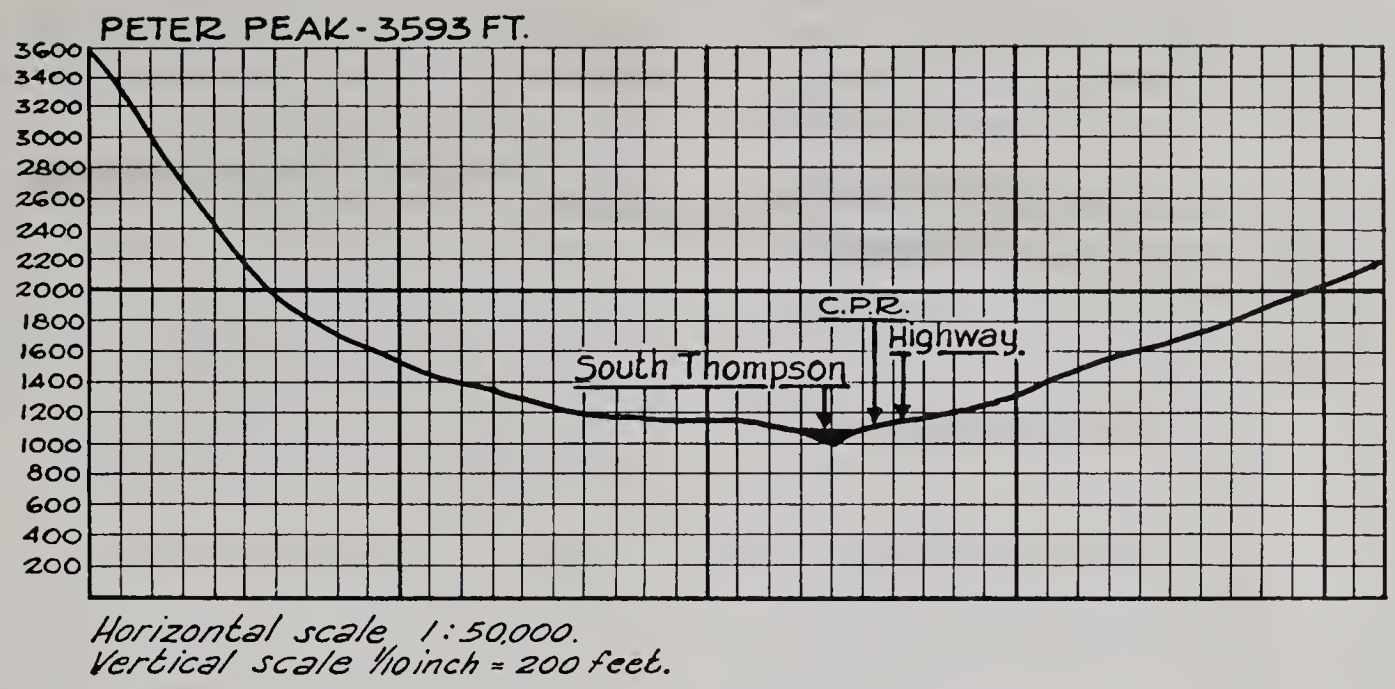
P. 415 Ranching in the Southern Interior

1. The influx of population provided a market for beef and stimulated the growth of ranching.
2. Mild winters and low snowfall are favorable to ranching. Extreme summer drought and occasional severe winters are sometimes unfavorable.
(a) The January average at Kamloops is 23°F. (39.2° at Victoria.)
(b) The July average is 70°F.
(c) The total annual precipitation is 10.16 inches. (94 inches at Prince Rupert.)
(d) The Southern Interior has cold winters, hot summers, and low precipitation at all seasons. The temperatures are more extreme because the area is not affected by the moderating influence of the sea. It is in the rain shadow area of the Coast Mountains.
3. Spring — Drive cattle to summer range, supply salt.
Summer — Cultivate hay.
Fall — Bring cattle down to bottom land.
Winter — Provide hay for cattle. Repair equipment.
This information could be expressed by pupils as a circular diagram.

P. 416 Question 3(c). See top of next page.

P. 417 Why is Kamloops a major interior settlement?

1. The North Thompson and South Thompson meet at Kamloops.
2. (a) The land is used for orchards.
(b) Precipitation is low throughout the year and summer temperatures are high. Dry hillsides appear in the photograph.
3. (a) This is on the south bank.



P. 416 Question 3(c) Section across the Thompson Valley near Kamloops.

(b) The other orchard areas are northwest of the city.
(c) Section — see illustration above.
4. (a) Kamloops is on a wide, flat terrace above the Thompson at its confluence point. North Kamloops is on a promontory at the confluence.
(b) Kamloops has an historic site, Hudson's Bay Company properties, and is on the edge of a large Indian reservation.
(c) The pipeline crosses the area from north to south. A pumping station and a refinery are located in this section. These lines originate in the Edmonton area and terminate at Vancouver.
(d) Oil is refined at Kamloops for local use. Gravel is available locally.
5. (a) C.P. and C.N. transcontinental lines use this route. The Trans-Canada Highway and many local roads pass through the area.
(b) The routes follow the valleys or benchlands and avoid the steep slopes wherever possible.
(c) Ribbon settlement is developing along the main roads east and west of the city.
(d) The airport is on the north bank about six miles west of the city.
6. Wooded areas occur above 2000 feet.
7. (a) Lillooet, Ashcroft, Lytton, Clinton, Merritt, and other centres look to Kamloops as their centre.
(b) The city is a transportation centre for passenger and freight traffic. It provides all services.
(c) Kamloops is a regional capital, route centre, industrial city, farming centre.

P. 419 Kamloops can be reached from Vancouver by:
— C.P.R.
— C.N.R.
— road via the Fraser Canyon.
— road via the Okanagan.
— air.

Vancouver is 272 miles from Kamloops.

The Okanagan Valley

Penticton is connected to Vancouver by rail via Princeton and Hope. There is a paved road following a similar route. Penticton is 260 miles from Vancouver. The Kamloops region has a greater variety of transportation facilities; it is on the two main transcontinental rail routes and on the Trans-Canada Highway.

P. 421 Peaches, apples, cherries, and pears are grown. Apples occupy most acreage. The creek flows south.

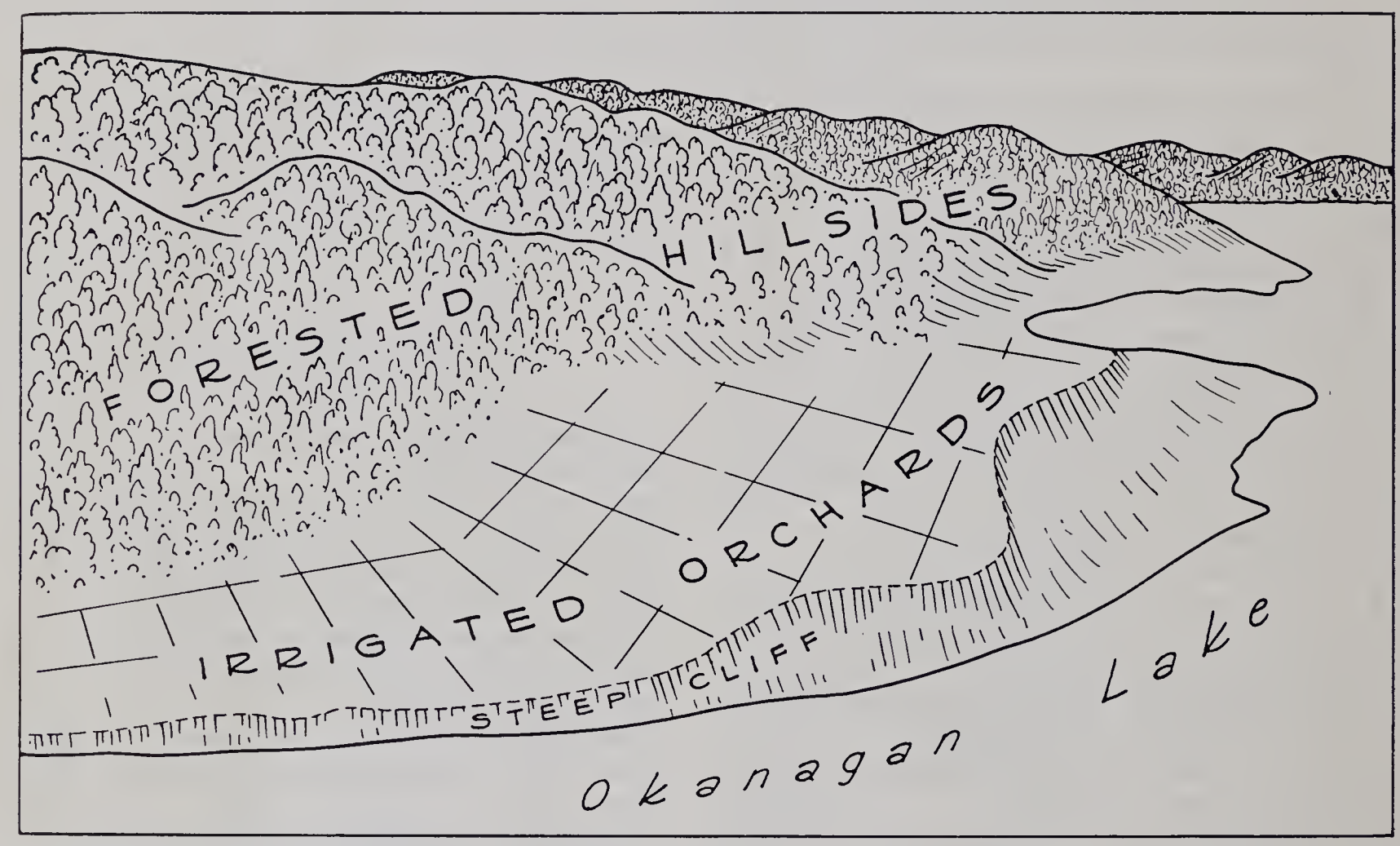
A further study of fruit-growing in the Okanagan

1. (a) Rich soils, available irrigation water, and a great deal of sunshine are favorable factors.
(b) The main problem is low precipitation. This is met by irrigation from an underground channel.

2.	**Niagara Orchard**	**Summerland Orchard**
Climate:	169-day growing season. 27 inches rainfall.	177-day growing season. 2000 hours sunshine. 11 inches precipitation.
Soil:	Sandy loam — heavily fertilized.	Fine black humus, fertilized.
Size:	42 acres — all fruit.	36 acres — 24 acres fruit.
Land Use:	Peaches, apples, cherries, strawberries, with peach emphasis.	Apples, peaches, cherries, pears. Apple emphasis.
Problems:	Ice storms, thunderstorms.	Water supply.
Marketing:	Large local market. Some canned.	Co-operative — limited local market.

3. (a) Thin forest, orchards, and bare slopes are shown. The cultivated areas are on the flat land between the mountain slopes and the steep banks of the lake.
(b) Thin forest cover at higher elevation and bare slopes near the lake suggest that precipitation is inadequate for fruit growing.
(c) The land is mountainous. It is rugged and difficult of access. Timber is an obvious resource, water power and minerals are other possible resources.
(d) The cultivated land is limited by the break of slope — to the lakeside cliffs on one side and to the mountain slopes on the other.
Cultivated land is limited to the flat areas on the benches.
4. (a) Trees escape frosts on the lowest lands due to air drainage.
(b) Mr. White's orchard is on an extensive area of flat land. The Penticton orchards are on limited patches of flat land amid the mountains. Cultivation is more intensive in the Niagara region.

Suggested pupil activity: Make a field sketch of the area shown in Figure 9-49 labelling all significant features clearly.



P. 422 Field sketch of area shown in Figure 9-49.

5. The July average at Oliver is 75°F, at Victoria 57°F. Victoria's summer temperatures are reduced by cool winds from the sea.
P. 424 The chief markets for Okanagan fruit are eastern Canada, U.S.A., and Europe.
P. 425 Penticton is located at the southern end of Okanagan Lake in a central position, in the Okanagan Valley. Road routes from Vancouver, Kamloops, Revelstoke, and U.S.A. meet at Penticton, rail routes converge from the east, west, and south.
P. 426 Sawmilling is done at Kelowna.
A backward glance at the Southern Interior
1. Population is concentrated in the trenches. Steep mountain slopes are the chief natural factor limiting distribution.
2. Land is used for fruit growing, ranching, lumbering. Occupations include fruit farming, canning, packing, marketing fruit and vegetables, ranching, sawmilling, service industries.
3. The area is linked with the outside world by road and rail routes following valleys and passes through the mountains. Recently air transport has become important. These links are vital because this is a region of specialist industries; also the produce must be marketed and requirements for the population brought in from outside. Activities associated with transportation are those concerned with servicing and operating equipment, building and maintaining roads and railways.
4. The unpopulated areas are rugged and forest

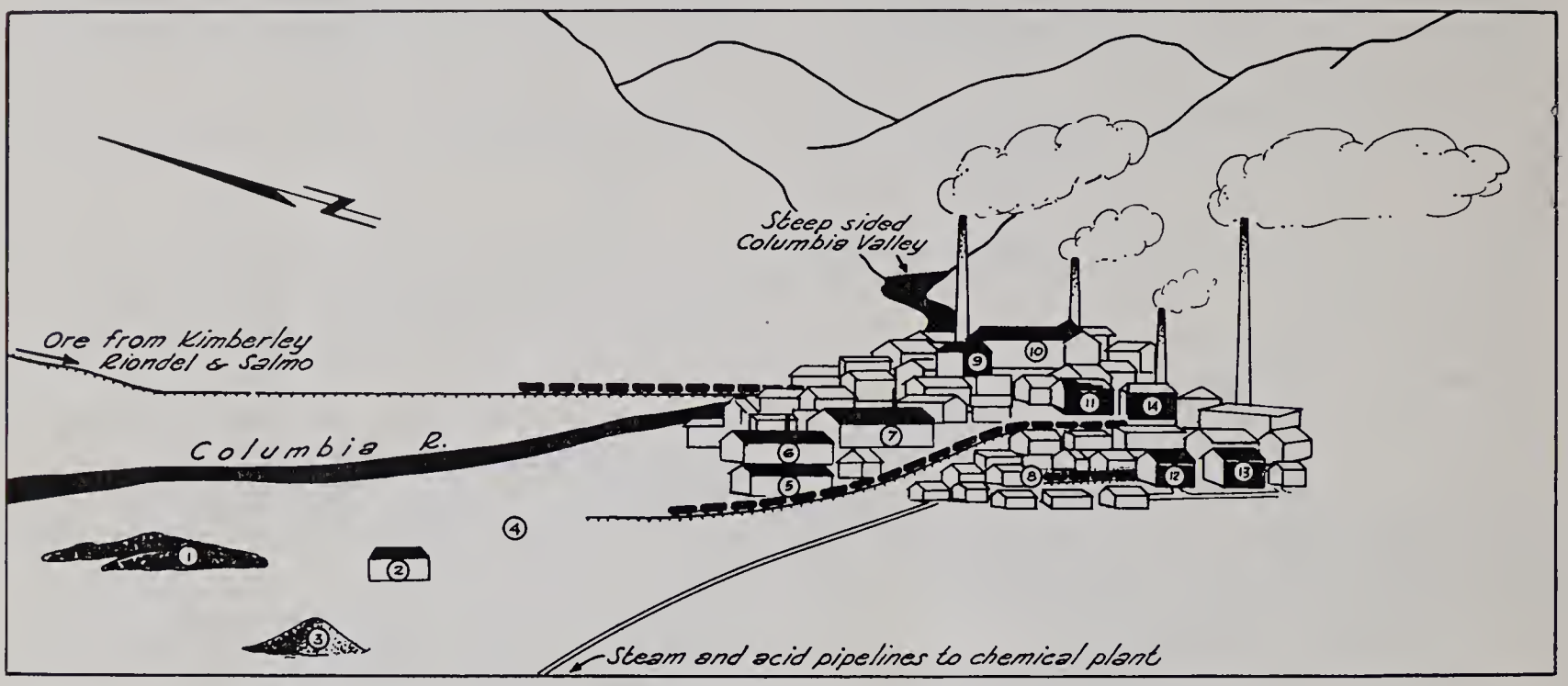
covered. Many areas are dry and dusty. These rugged, remote areas are likely to remain unsettled.
P. 426 The C.N.R. passes through Prince George and connects it with Prince Rupert. Prince George is 514 miles from Vancouver. The P.G.E. connects it with Vancouver. Highways converge on Prince George from Prince Rupert, Williams Lake, and Dawson Creek. The route from Vancouver is via the Fraser Canyon, Williams Lake, and Quesnel.
The Peace River District
P. 427 Grain and livestock are the chief forms of farming. The land is gently rolling. It is being used for wheat. The climate has cold winters, warm summers, and low precipitation throughout the year.

Comparison of temperatures

	Peace River	Southern Interior	Coast
January	8	22	35
July	60	70	58

Sunshine in July –
Fort St. John – 300 hours.
Vancouver – 280 hours.
Fort St. John, in a more northerly latitude, has longer hours of daylight in July than Vancouver.
P. 428 The transportation links of the Peace River District
1. (a) Southern terminus – North Vancouver.
(b) Northern terminus – Fort St. John.
(c) Rail mileage is about 685 miles.
2. (a) The train journey takes 25 hours.
(b) It passes through Lillooet, Williams Lake, Quesnel, and Prince George. Landscapes seen include –
Lillooet (p. 410) rugged mountain scenery, very dry.
Williams Lake (p. 426) hilly, ranching country, thinly settled.
Prince George (p. 426) rolling, forested country.
Dawson Creek (p. 428) gently rolling, cultivated land.
3. (a) Dawson Creek lies 338 miles northwest of Edmonton.
(b) Dawson Creek is south of the Peace River.
(c) Dawson Creek is 49 miles southeast of Fort St. John.
P. 429 Vancouver is the terminus of the gas and oil pipelines.
Southeastern British Columbia
P. 429 The Monashee Mountains form the western limit of the Kootenay area.
The mountain and valley character of S.E. British Columbia
1. (a) The Kootenay River appears in the photograph.
(b) It flows into Kootenay Lake.
2. (a) The valleys have steep sides and flat floors.
(b) The trench floor is flat and intensively cultivated.
(c) The trench sides are forested and the floor cultivated.
(d) The mountain ranges are the Selkirks on the left and the Purcells on the right.
3. (a) Revelstoke is on the Columbia River.
(b) The Monashee Mts. are west of Revelstoke. Revelstoke is on the east bank of the Columbia.
(c) The mountains are a range of high glaciated peaks.
P. 431 Spectacular scenery and abundant forest cover provide some evidence for these industries. The Yellowhead (C.N.R.), Kicking Horse (T.C.H. and C.P.R.), and Crowsnest (C.P.R.) are the main passes.
P. 432 Figure 9-1 shows the concentration of dots in the trenches. Figure 9-53 shows the location of settlements in the trenches.
P. 432 There are four national parks in the Kootenay area.
P. 434 Trail
1. (a) Trail is situated on terraces of the Columbia River, closely hemmed in by mountains.
(b) The main part of Trail is on the west bank of the Columbia.
(c) The general elevation of the city is about 1500 feet.
(d) Lack of flat land makes expansion difficult.
(e) Roads and railways follow the valleys – Columbia River and Trail Creek.
2. (a) The smelter and its smoking chimneys are clearly visible.
(b) The industry is located on the west bank.
(c) The hydro-electric plants are located on the Kootenay River.
(d) Ores are brought 150 miles from Kimberley by rail.
3. (a), (b), and (c) see top of next page.
Trail has cold winters (colder than Ladner and similar to Kamloops).
Precipitation is higher than at Kamloops but not as high as at Ladner.
Precipitation increases eastward from the dry interior as winds rise to cross the mountains.
(d) The mountainous nature of the land makes for great variations in climate.
P. 435 In 1958, 80% of Canadian lead production and slightly more than 50% of zinc production was accounted for by British Columbia.
For additional detail on the industrial plant see attached field sketch on following page.

3.	Trail	Kamloops	Ladner
(a) Winter temperatures	25-30°F	22-30°F	35-40°F
(b) Summer temperatures	65-70°F	60-70°F	60-67°F
(c) Total precipitation	26.45 ins.	10.16 ins.	36.2 ins.



P. 435 Smelter-refinery shown in Figure 9-57.

① Stockpiles of coal and coke.
② Garage.
③ Limestone rockpile.
④ Salvage yard.
⑤ Thaw shed – thaws concentrates in winter.
⑥ Lead rolling mill.
⑦ Lead refinery (produces lead, silver, bismuth, antimony, gold).
⑧ Concentrator – crushes ores.
⑨ Oxide leaching – recovers zinc from lead smelter.
⑩ Lead smelter – produces lead from concentrates and treats smoke.
⑪ Zinc roasters.
⑫ Acid plant – produces sulphuric acid from metallurgical gases.
⑬ Zinc plant.
⑭ Service shops.
Chemical and fertilizer plants at separate location produce fertilizers, chlorine, caustic soda.

P. 438 Reviewing Southeastern British Columbia

1. Main geographical characteristics include:
– mountain and valley topography, many lakes, spectacular scenery.
– hot summers, cold winters, moderate precipitation (variety of mountain climates).
– agriculture limited to valleys – e.g. Kootenay Trench near Creston.
– mixed grains and fruit growing.
– mineral wealth (lead, zinc, silver, gold, coal), hydro-electric power.
– some lumbering and pulp and paper development.
– communication between trenches is difficult and costly.

This region is more mountainous than the Southern Interior, has heavier precipitation, thicker forest cover. Ranching is less important, fruit less important, minerals more important.

2. Assets for industrial future:
– mineral wealth.
– hydro-electric power, near coal and oil fields.
– skilled workers already established.
Problems of transportation and communication will always be a major handicap.

3. Tourist attractions include:
– spectacular mountain and lake scenery.
– many National Parks with facilities.
– abundant game and fish.

– winter sports, pleasant summer climate.
– ghost towns.
Routes to the region include:
– C.P.R. from Vancouver and Calgary.
– paved highways from Calgary, Vancouver, and points in Washington, and Idaho.
– air services with both ground and water landings available.

P. 438 British Columbia as a whole

1. (a) The greatest concentration of sawmills and pulp and paper mills is on the coast.
(b) Lumber and lumber products are normally among the first five or six principal Canadian exports. British Columbia is by far the chief source of Canadian lumber and its forests thus play a large part in the nation's foreign trade. Newsprint and wood pulp are, together, normally Canada's leading export. British Columbia's growing pulp and paper industry is contributing to this.
2. Grain, grain and livestock, beef, fruit and vegetable, and dairying regions are clearly distinguished. For material on Peace River grain, review pages 427-429.
Cariboo grain and livestock, pages 426-7.
Beef cattle, review pages 412-415.
Fruit and vegetables in Okanagan, pages 419-426.
Dairying in Lower Mainland, pages 373-378.
Apples are British Columbia's chief agricultural export.
3. (a) Largest concentrations of hydro-electric power are
(1) in or near the Lower Mainland region, consumption by domestic and industrial users in Metropolitan Vancouver;
(2) in the Bridge River area, about 150 miles north of Vancouver, consumption mainly by Greater Vancouver;
(3) at Kemano, consumption mainly by the great aluminum smelter at Kitimat;
(4) between Nelson and Trail in the Kootenay area, consumption by local municipalities and by the great industrial complex at Trail.
(b) Coal from Fernie, oil and gas from Alberta are also available.
(c) Lead, zinc, silver, and gold from Southeastern British Columbia are the most important sources of mineral wealth. These are sold in the United States. Copper from Southern Interior and iron ore from Vancouver Island are sold mainly to Japan.
4. (a) British Columbia is a small market and obtains most of its manufactured goods from centres already established in the east.
(b) Prices are higher on account of transportation costs.
(c) Main transportation links are:
– C.P.R. from Vancouver via Calgary.
– C.N.R. from Vancouver via Edmonton.
– C.N.R. from Prince Rupert via Edmonton.
– Trans-Canada Highway from Vancouver via Rogers Pass.
– Air services to all points.
(d) Wheat, oil and natural gas, beef are the main Prairie products to pass through British Columbia. Wheat is shipped to China and Japan, oil to the United States. For these products it is cheaper and quicker to ship via British Columbia than eastwards.
5. (a) The mild coastal climate attracts many people. Spectacular scenery and wild country attracts others.
(b) British Columbia is the part of Canada nearest to Asia.
6. (a) The Lower Mainland contains nearly half the people. The city of Vancouver, industrial and agricultural developments account for this.
(b) Most of the people of Vancouver Island live on the east side. The west coast is rugged and densely forested. Forest resources are the chief wealth of this region.
(c) A harbor is an area providing sheltered anchorage for shipping. A port is a settlement with facilities and services for handling cargoes and shipping. Prince Rupert is the only important port of the Coast Mountains. Most of the region is undeveloped because of the difficulty of communicating with other regions.
(d) The interior has more extreme climate, is less densely forested. Types of farming in the interior vary from grain to fruit to ranching. Some areas are very arid, others quite well watered. Some are plateaulike, others consist of rugged mountains. Some are based on agricultural economy, others on mineral wealth.
7. Almost all B.C. is mountainous. It contains some of the wettest rain forest in the world and some of the driest desert; snowcapped peaks and reclaimed dykelands, a vast metropolis and tiny remote settlements. Its people pursue a great variety of occupations ranging from the fishermen of the coastal inlets to the cowboys of the Cariboo, from the wheat farmers of the Peace River to the miners of the Kootenays, from the dairy farmers of the Lower Mainland to the loggers of Vancouver Island, from the government employee in Victoria to the sawmill worker in Vancouver.

CHAPTER 10 THE NORTHWEST TERRITORIES AND THE YUKON

Note: The emphasis in this chapter is on the variety of landscapes, peoples, and ways of life in the modern Northland. The questions on page 444 point to the main outcomes of the study.

P. 441 Picture studies of the Northland

1. Ice remains in the water and the people are warmly clothed.
2. A large quantity of supplies is being landed. That few people have congregated on this important occasion indicates a small settlement.
3. The icebreaker clears a passage for the Patrol vessels.
4. (a) Absence of snow indicates a summer picture.
(b) The land is forested at Fort Smith, treeless at Pangnirtung.
(c) Life at Fort Smith would be similar to that in towns of Northern Quebec and Ontario.

P. 444 Ellesmere Island to Windsor: almost 3000 miles.
Halifax to Vancouver: 3000 miles.
Canada's north-south extent is as great as the east-west extent.

P. 447 Five views of land and life

1. (a) Baker Lake — 21 ins.
Ottawa — 85 ins.
Montreal — 112 ins.
(b) Residents sell furs and carvings and purchase supplies — food, ammunition, etc.
(c) There are several radio masts.
2. (a) Various grasses, flowers, and lichens are growing.
(b) The land is flat.
(c) River, lakes, summer flowers, green meadows, rolling plains are shown in the picture.
3. Men work for wages with which to purchase supplies instead of living off land. Their lives are stationary and they live in a larger, more organized community than those at Pangnirtung.
4. This is a winter scene. Snow and ice provide a more regular surface than the mixture of rock, water, and bog that forms the summer landscape.

P. 450 The climate of the Arctic and the Subarctic

1. (a) At Alert 9 months are below freezing.
7 months are below zero.
(b) The July temperature is well below 50°F.
(d) Total precipitation — 5.9 inches. The snowfall is less than at most centres of southern Canada. This confirms that the Arctic is not an area of heavy snowfalls.
2. (a) At Fort Simpson 7 months are below freezing. 3 months are below zero.
(b) The July average at Fort Simpson is 63°F.
Victoria 60°F.
(c) Total precipitation — 12 inches.
(d) Plants grow faster in this northerly location on account of longer hours of daylight.
3. Clothing includes furs, parkas, high collars, hoods. Indian groups live south of the tree-line.

P. 453 Old and new ways of life

1. (a) The tents are made of canvas or nylon and have been purchased from a store.
(b) Other goods are stovepipes, barrels.
2. (a) The man is shaving blocks of snow.
(b) He is using a metal machine-made knife and wearing a machine-made parka.
3. (a) The men are erecting a prefabricated house frame.
(b) So many long, straight pieces of lumber could not have been obtained in the neighborhood.
4. The fur of the white fox is valuable.

P. 455 Products shown include tea, packaged foods (including lard probably), blankets, clothing, and other goods.

P. 456 The season is winter. The men have trapped beaver. They travel on snowshoes. Their clothes appear to be mass-produced and purchased from a store.

P. 456 White men man radio stations, defence posts, weather stations, Hudson's Bay posts, R.C.M.P. posts, missions, mining developments, airstrips.

P. 457 Six Settlements

All the settlements mentioned are in the western Arctic south of the tree-line.
Lumbering is a possible source of income at Fort Smith. There is a fairly dense cover of coniferous trees.
Aklavik lies west of Inuvik. Both towns are north of the Arctic Circle.
Inuvik is 900 miles from Hay River; 1500 miles from Edmonton.

P. 459 The land is flat and very poorly drained. Aklavik is at the water's edge in a great meander of the Mackenzie. Flooding is a problem. Great quantities of mud and silt carried by the river make it brown.

P. 461 The problem of permafrost at Inuvik

1. (a) The school is raised on stilts. This minimizes the amount of heat from the building melting the permafrost. Gravel pads also insulate the permafrost.
2. (a) The utilidor system appears as white lines.
(b) Problems at intersections of roads and utilidors have been overcome by putting the roads on overpasses.
(c) Elevated roads prevent swampy conditions that melting of the permafrost would bring.

(d) The power plant on the river bank uses oil brought by barge on the Mackenzie.

P. 464 Fort McPherson

1. Services available include school, churches, community hall, post office, store.

2. Air (wheel and float planes) and water transportation are available. Sandbars are a navigational hazard in the Peel River.

3. (a) Oil is used for fuel. It is brought to the wharf by boat and then moved to the tank by pipeline.

(b) The power station, located on the oil pipeline, is a thermal station. There is no water close by.

4. (a) There are several gardens.

(b) There is no road or rail communication. Supplies must be brought by water which is only possible in summer.

Total reliance on air supply is uneconomic except in special cases.

5. Wood is available for building. Most people live in log houses. There are some frame houses and a few modern houses.

6. The settlement sprawls along the river bank. It occupies an elongated area about half a mile long and a hundred yards wide.

P. 464 White fox, muskrat, beaver, mink are the most important fur-bearing animals.

Commercial fishing is developing on Great Slave Lake.

Gold, nickel, and copper are mined at Yellowknife and Rankin Inlet.

Lead and zinc are found at Pine Point.

P. 466 All the road and rail mileage is concentrated in the Subarctic. Dogsleds are used in the Arctic. Problems of distance, lack of population, lack of materials, expense, and severe climate have prevented the building of roads in the Arctic. These problems, plus those of forest and muskeg, also apply to the whole Canadian Northland. A small population provides less tax money for transportation and no mass market to reduce costs.

A range must be shipped nearly 2000 miles by rail to Edmonton, then by the Mackenzie Highway to Great Slave Lake, then by barge down the Mackenzie. This is a long journey requiring several trans-shipments and is very costly. The total distance is about 3500 miles.

P. 467 Air transport is too expensive for heavy and bulky goods.

P. 468 Gold discoveries promoted the White Pass Railway.

Lead and zinc discoveries promoted the Pine Point Railway.

P. 469 The magnetic compass is unreliable because this region is so near the magnetic pole. In summer the stars are not visible because of the long hours of daylight.

P. 470 Reviewing the Northland

1. (1) Eskimos, Indians, and white men live in the Northland. They earn a living by hunting, fishing, mining, forestry, and manning defence and communication posts.

(2) Vast distances make communication a problem. Severe climate impedes all activity, prevents much farming.

(3) Transportation can bring in essentials from outside, export produce such as minerals, provide communication and services to isolated settlements.

(4) The Northland has mineral, fur, fish, and lumber wealth. It lies between the populated parts of Canada and U.S.S.R.

(5) This is a matter for speculation. The military importance of the Northland seems likely to continue. Its mineral wealth is certain to be of growing importance. This will attract settlement and require the provision of more transportation facilities. The existing settled areas of the Canadian Shield provide some clues to the future development of the Northland. The northern areas of the Soviet Union also provide clues. Pupils might be invited to consider some features of the Clay Belt of Northern Ontario (see Chapter 3). The point should, of course, be made that the fertile areas and longer frost-free seasons in Northern Ontario provide conditions that do not exist in the Northland, although the Yukon has real agricultural possibilities. Abler pupils might be detailed to gather information on the Soviet North.

2. Differences include variations in vegetation from thick forest to bare ice-cap; climatic variations; different Eskimo and Indian groups.

3. All parts are remote from main Canadian centres. All are thinly populated. All have severe climate. All have transportation problems.

4. Cold is overcome by heavy clothing, insulated housing. The lack of any real growing season over large areas and permafrost problems are climatic conditions that restrict agriculture and settlement. For reasons brought out in 1. (5) above, these handicaps seem likely to restrict the development of the Northland in the foreseeable future.

P. 471 Southern Ontario has some of the richest farmland in Canada and also the greatest concentrations of industry.
P.E.I. consists almost wholly of level, rolling agricultural land.
The people of Newfoundland look to the sea rather than the land for a living.
Labrador is an exceptionally inhospitable land.
The population of interior B.C. is strung out along river valleys, most of the settlements having been established along trails, road and rail routes, or beside the limited areas of good agricultural land. All of these are found in river valleys.
Almost one quarter of Canadians live in Greater Toronto and Greater Montreal.

P. 472 Relief, climate, soils, and vegetation in Canada

(a) The land is too high or too steep in most of the Western Cordillera and in parts of the Shield and Appalachian areas.
(b) High, steep areas affect Canadians because:
they isolate areas from each other;
they increase transportation costs and hence the cost of all freight moved;
they provide power, lumber, minerals, and recreation areas;
they often influence the climate considerably and thus the vegetation, soils, land use, and settlement.
(Pupils might be asked to suggest examples of such influences by comparing the Pacific Coast regions with those of the British Columbia interior or the Prairies.)
(c) Expand "b" above.
(d) Densely populated plains include the Lower Mainland of B.C. and the Great Lakes-St. Lawrence Lowlands.
Moderately populated plains include much of the Prairies and P.E.I. Unpopulated plains include Hudson Bay Lowland, Arctic Barrens. These areas are too cold and too remote to support dense populations.
(e) Largest areas of mineralized rocks are in the Shield, Western Cordillera, and Appalachian areas. The surface soil has been scoured from these areas in the Ice Age. Population is sparse; settlements are located where mines have been developed and communications established. Great distances, severe climate, and shortage of agricultural land make settlement difficult. Lumber, power, game, fish, furs are also found.
(f) In southern Canada, especially the Prairies and Lake Peninsula, the Ice Age was beneficial because the glaciers deposited large quantities of sediments or because fertile soils developed out of the lakebeds of post-glacial lakes.
2. (a) Most of southern Canada, in a belt within 200-300 miles of the United States border, has a growing season of at least 100 days. The mountainous areas of southern British Columbia and upland areas of regions such as northern New Brunswick are exceptions to this. The term "growing season" is ambiguous. Obviously, different crops have different growing seasons. The term "frost-free season" has been used frequently in this book and is explained on page 8. This may be a more satisfactory concept to use at the grade levels for which the book is intended.
The longest growing season in Canada is in southwest British Columbia. At Victoria, it averages 280 days per year.
(b) The growing season is too short in the north. Population density is very sparse.
(c) Southern Alberta and Saskatchewan have the lowest rainfall. Population density is lower in these areas and is related to the availability of water. Drought conditions have been overcome by irrigation projects (such as the St. Mary's Dam) and dry farming methods (such as in the Pincher Creek area).
(d) Precipitation in the Arctic is low and comes mainly in the form of snow.
(e) The areas of heaviest precipitation are found on the Pacific Coast, especially on the British Columbia mainland between Vancouver and Prince Rupert and on the west coast of Vancouver Island. These areas are generally sparsely populated. However, the extremely rugged terrain and absence of any extensive areas of level land also help to account for the lack of settlement. There is no necessary causal connection between the high precipitation and low population density.
3. *Arctic* — long cold winter, short warm summer, low precipitation.
Northern — long cold winter, short hot summer, fairly low precipitation.
Pacific — mild winter, cool summer, heavy precipitation with marked winter maximum.
Cordillera — varies with altitude and aspect from temperate desert to alpine.
Prairie — cold winter, hot summer, moderate to light precipitation.
Southeastern — cold winter, hot summer, moderate precipitation at all seasons. Pacific is influenced by winds from the ocean which moderate temperatures and bring heavy rainfall; Cordillera is cut off from such influences by mountains and is much more

continental in character. Arctic is more extreme form of *Northern* with shorter growing season, more severe temperatures.
The Prairies, in the heart of the continent, have more extreme climate than the southeast.
4. (a) Tundra areas are in the extreme north. Temperatures are too severe to permit growth of trees. Great altitude accounts for such vegetation in parts of Alberta and B.C.
(b) The tree-line separates the forest and barren from the tundra.
(c) Coniferous trees are a valuable source of pulpwood for the paper industry. Hydro-electric power has been essential to the growth of forest industries.
(d) The largest non-forested area is in southern Alberta and Saskatchewan. This area is too dry for forest growth. The land is used for agriculture.
(e) Only about ¼ of the "Prairie Provinces" is grassland. The boreal forest in these provinces is further north and further from markets than in the east.
(f) The Great Lakes-St. Lawrence forest region extends into Ontario, Quebec, Manitoba, and New Brunswick. Most of the land in southern Ontario has been cleared for agriculture and settlement.
(g) Four forest zones are found in B.C. The mountainous nature of the land and the variety of climates account for the variety. The Coast Forest is of greatest economic importance. Mild temperatures and heavy precipitation account for the existence of the forest.
5. The best prairie soils were formed from lacustrine and glacial deposits. Other good soils occur in the Lower Mainland of B.C., the Great Lakes-St. Lawrence Lowlands, Annapolis Valley, and P.E.I. The Shield has poor soils because much has been scoured away by ice. Newfoundland has rocky areas with poor soils. The Arctic has poorly drained soils.

P. 475 Farming in Canada

1. (a) Prairies and Great Lakes-St. Lawrence Lowlands contain most of Canada's farmland. The area of farmland in the Prairies is twice as large as that in the Lowlands. Prairie farms are largely devoted to grain and livestock; farms in the Lowlands grow a great variety of crops including many specialized crops such as fruit and tobacco. There is great emphasis on dairying due to the large local markets.
(b) Less than half the prairie farmland is in wheat specialty. (The prairie farms studied in the text emphasized the importance of other grains.)
(c) Lacustrine clays make farming possible in the Clay Belt and Lake St. John areas. Produce is marketed locally.
(d) P.E.I. — potatoes.
Upper St. John Valley — potatoes.
Annapolis Valley — apples.
Okanagan — fruit.
Saanich Peninsula — early vegetables and flowers.
2. (a) Distribution of farms correlates clearly with the population map and also with the "types of farming" map.
(b) There are more farms in Quebec and Ontario than in the three Prairie Provinces. The Prairie Provinces have more land under cultivation. This suggests that prairie farms are generally larger. Farms in the Maritimes cluster around the coast and in B.C. are concentrated in river valleys.

Fishing

Eastern — cod, haddock, herring, lobsters, salmon, sardines.
B.C. — salmon, halibut, herring, cod, sole.
Rocky coasts with sheltered harbors close to valuable fishing grounds make these coasts suitable for fishing bases.
The most valuable interior fishing areas are in the Great Lakes, the Prairie lakes, and Great Slave Lake.

P. 476 Mining in Canada

1. (a) Metallic, fuel, and industrial classifications are used.
(b) Nickel is the leading metallic mineral by value. Uranium, copper, and iron are also important.
(c) Uranium — Ontario.
Nickel — Ontario.
Copper — Ontario.
Iron ore — Quebec.
Gold — Ontario.
Zinc — British Columbia.
Lead — British Columbia.
Silver — Ontario.
Platinum — Ontario.
Petroleum — Alberta.
Coal — Nova Scotia.
Natural gas — Alberta.
Asbestos — Quebec.
Salt — Ontario.
Gypsum — Nova Scotia.
Sulphur — British Columbia.
Titanium oxide — Quebec.
Fluorspar — Newfoundland.
Peatmoss — British Columbia.
Sodium sulphate — Saskatchewan.
(d) Alberta accounts for the bulk of crude petroleum. The use of diesel engines for trains and boats has reduced the importance of coal. Nova Scotia produces the major portion of the nation's coal. These fuels are all used to produce electricity.
2. (a) Ontario was the leading province in total value of mineral production.
(b) 57% of the total output was accounted for by Quebec and Ontario. Alberta, Saskatchewan, and B.C. are also important.
(c) Ontario — nickel, gold, iron ore, copper, lead, zinc, silver, platinum, cobalt, uranium.
Quebec — gold, iron ore, copper, silver, zinc, titanium, asbestos.

Alberta — oil, natural gas, coal.
Saskatchewan — oil, gas, zinc, lead, silver, gold, lignite, salt, sodium sulphate, uranium, potash.
British Columbia — gold, silver, lead, zinc, copper, iron.
(d) Newfoundland — iron, lead, copper, zinc, silver.
New Brunswick — coal, lead, zinc.
N.W.T. — gold.
Nova Scotia — coal, gypsum.
Manitoba — copper, nickel, zinc, gold, petroleum.
3. The most striking relationship will be seen between the ancient crystalline rocks of the Canadian Shield and metallic mineral production. The occurrence of oil and natural gas in sedimentary basins is also noteworthy.

P. 478 The Athabaska oil sands are untapped because of their remote location and because until very recently a method of extracting the oil economically had not been discovered.
Future discoveries will likely be in the Shield areas of the north.
Conservation can be accomplished by controlling development and overproduction, preventing wasteful methods, etc.

P. 478 Canada's water-power wealth
1. *Developed water power*
(a) Quebec leads.
(b) Quebec accounts for about ½ the national total.
(c) Ontario ranks second.
2. (a) Most of this power is found in the Canadian Shield.
(b) Many rushing streams, storage basins, adequate precipitation make this region rich in water-power resources.
(c) Beauharnois, the International Rapids, and Niagara are major producers in the Lowlands.
3. *Available water power*
(a) Quebec leads in available water power.
(b) B.C. ranks second.
(c) The main available sources in the prairie provinces are in their northern sections.
(d) There are large undeveloped sources in Ontario, Yukon, and Newfoundland.

P. 479 In southern Quebec and southern Ontario hydro-electric power is available; coal can be brought in cheaply by water; and oil and gas by pipeline. This small sub-region is at the meeting place of routes and is therefore a convenient assembly point for raw materials. Large markets exist close by and there is excellent transportation to more distant markets.
The area is a great reservoir of capital, labor, and experience.
Sydney — iron and steel.
Halifax — oil refining.
Saint John — oil refining.
Sault Ste. Marie — iron and steel, pulp and paper.
Winnipeg — railway maintenance.

Bauxite	British Guiana Jamaica	Aluminum	Arvida, Kitimat
Cotton	U.S.A.	Textiles	Quebec and Ontario
Wool and woollen goods	Australia, Great Britain		
Sulphur	U.S.A.	Pulp and paper	Widespread

Major exports
1. Newsprint paper.
2. Wheat.
3. Lumber and timber.
4. Wood pulp.
5. Aluminum (primary and semi-fabricated).
6. Nickel (primary and semi-fabricated).
7. Copper (primary and semi-fabricated).
8. Iron ore.
9. Asbestos.
10. Synthetic rubber and plastic materials.

Canadian exports to U.S.A.
Newsprint
Lumber
Oil and gas
Aluminum
Various minerals (iron ore, lead and zinc, nickel, copper, etc. — both primary and semi-fabricated. Ores are usually concentrated before export.)

U.S. exports to Canada
Coal
Automobile parts and machinery
Petroleum
Various foodstuffs (pupils might consider the origin of some of those found in their local stores or supermarkets, e.g. oranges from Florida, etc.)
Regina — oil refining, flour milling, slaughtering, clay and cement products, steel mill.
Edmonton — oil refining, chemicals.
Calgary — oil refining, meat packing, flour milling, construction materials.
Vancouver — pulp and paper, saw milling, fish canning, flour milling, oil refining, sugar refining.
Railways to the north were built mainly to serve mining communities. The Ontario Northland Railway (beginning at North Bay, terminating at Moosonee) was the earliest and best example of this. It was vital to the development of the province's

great mining belt. The railway from Sept Iles to Schefferville serves the iron mining area of Labrador and New Quebec. The significance and functions of these lines should also be noted: Hudson Bay Railway (terminus, Churchill); line to Lynn Lake, Man.; line to McMurray, Alberta; line to Pine Point, N.W.T.; lines serving the Peace River districts of both British Columbia and Alberta.

P. 479 It is cheaper to carry a bulk commodity such as iron ore by rail because one engine and a small crew can move many cars of freight.

Inland water transportation is most important on the Great Lakes-St. Lawrence waterway. Freezing is the greatest limitation on the use of this system.

Pp. 481-2 Foreign Trade

Note: As suggested in the text, most of the information required here can be obtained from the current *Canada Year Book.*

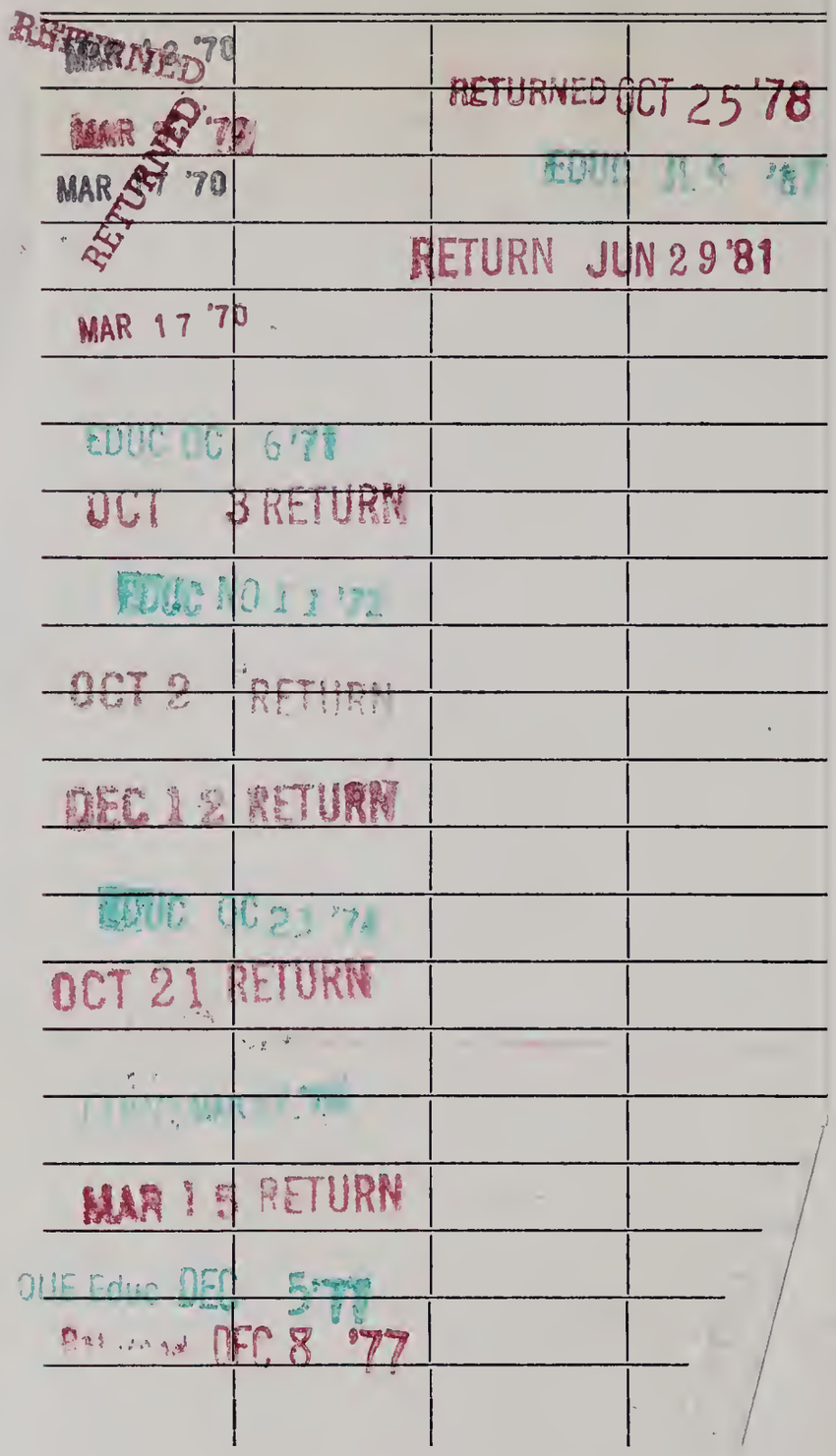
Canada is a producer of primary goods such as lumber, newsprint, wheat, and must find markets for them.

In 1961 Canada ranked 5th in the world in total trade.

Imported goods

Commodity	Origin	Purpose	Special Area
Sugar	Central America	Food	Vancouver, Montreal, Saint John
Tea	India	Food	Montreal
Coffee	Brazil	Food	Montreal

Date Due


RETURNED
MAR 17 '70
RETURNED OCT 25 '78
RETURN JUN 29 '81
MAR 17 '70
OCT 3 RETURN
OCT 2 RETURN
DEC 12 RETURN
OCT 21 RETURN
MAR 15 RETURN
DEC 8 '77

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